

**ARCADIS Avantic**

English  
Operator Manual

SPR2-330.620.01.02.02

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**SIEMENS**

# Operator Manual ARCADIS Avantic

**VB 13 C**

**SP**



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**SP**

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# System Operator Manual

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# SIEMENS

## Operator Manual ARCADIS Avantic Safety

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

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## General safety information

### *Information about this Operator Manual*

Proper use of this equipment presupposes that the operating personnel are familiar with the Operator Manual. This manual must be studied in detail prior to starting up the system. Special attention must be given to the following sections:

- ☐ Safety information
- ☐ Functional and safety checks
- ☐ Personal safety
- ☐ Equipment safety

The operating personnel must be instructed in the proper operation of the equipment. Training must be repeated as required at appropriate intervals. We recommend simulating emergency conditions during training so that appropriate corrective measures can be taught.

### *Warnings*

**Warning** Warning is used to indicate the presence of a hazard which can cause personal injury or death.

---

#### **WARNING**

At first the source of danger is stated.

**Then possible consequences are pointed out.**

- ◆ In conclusion you receive information on how to rule out any danger.
- 

**Caution** Caution is used to indicate the presence of a hazard which can cause damage to the equipment if this is used improperly.

---

#### **CAUTION**

At first the source of danger is stated.

**Then possible consequences are pointed out.**

- ◆ In conclusion you receive information on how to rule out any danger.
-

## *General information*

**Note** Note is used to notify users of operator information which is important but not hazard-related.



*Notes are marked with an exclamation mark “!” and printed in italics.*

## *Information about correcting errors*

Information on how to solve problems that might occur when performing operating steps is given at the end of the relevant instructions.



In these paragraphs, the problem and the potential source of error is described.

◆ Perform these operating steps to solve the problem.

## *Names and parameters*

All names and data of patients and institutions that are used in this operator manual are entirely fictional.

Any resemblance to names of existing people or institutions past or present is entirely coincidental.

All parameters and images shown in this manual are examples. Only the parameters displayed by your system are definite.



---

## *Laws and regulations*

If legally binding regulations govern the installation and/or operation of the system, it is the responsibility of the installer and/or the operator to observe these regulations.

In all countries, the legally established regulations are to be observed. Deviating from this Operator Manual, values may be set according to country-specific regulations.

This product is provided with a CE marking in accordance with the provisions of Directive 93/42/EEC of June 14th, 1993 concerning medical devices.

Data related to individual persons are subject to data protection. Ensure compliance with all applicable laws and regulations.

Legally required tests must be performed at the specified intervals. These tests include, for example,

- ☐ Constancy test according to the X-ray ordinance (§16 RöV) in the Federal Republic of Germany.
- ☐ Tests based on DHHS guidelines (Department of Health and Human Services) where applicable.

## *Scope*

This Operator Manual is valid for the following product:

- ☐ ARCADIS Avantic

## *Software*

The system and user software used in this product is protected by copyright.

---

### **WARNING**

Use of unreleased software or manipulations/modifications to released software can lead to system malfunctions.

**This can result in injury to the patient and/or damage to the equipment!**

- ◆ Only software released by Siemens for use with this product may be used.
- 

---

### **CAUTION**

Impermissible or faulty manipulations/modifications to the software or to the connection between the ARCADIS Avantic system and the power supply can lead to malfunctioning of the system.

**Unauthorized access!**

- ◆ Make sure all necessary precautions are taken (with the existing level of security) when changing a functionality or factory-set configuration.
- 

---

### **CAUTION**

Reduced system performance due to overload of the network environment.

**Unexpected system behavior!**

- ◆ Only use the ARCADIS Avantic system in a secure and load-adapted network.
-

---

## *Equipotential bonding*



Products for which equipotential bonding is required may only be operated in medical facilities where supplementary equipotential bonding has been installed and tested according to DIN VDE 0107/10.94 section 4 or the relevant country-specific regulations.

## *Electromagnetic compatibility*

This medical device complies with the requirements of the applicable standard on electromagnetic compatibility (EMC).

(→ see Operator Manual "Information on electromagnetic compatibility")

However, we wish to inform you that other mobile electronic devices such as radio telephones (mobile phones) exceed the radiation limits specified in the EMC standard and can therefore disturb functions of your medical device.

## *Use in connection with high frequency*

The following regulations for use must be observed:

- ❑ IEC/TR 1289-1 / 07.94/  
High frequency surgical equipment - Part 1: Operation
- ❑ IEC/TR 1289-2 /08.94/  
High frequency surgical equipment - Part 2: Maintenance

## Maintenance and check up

Before using the equipment for examination, the user must ascertain that all safety-relevant devices function properly and that the system is ready for operation.

### Wear and tear

The system is subject to mechanical and electrical wear and tear. In the interest of the safety of patients, operating personnel and third persons, maintenance and safety checks must be carried out every 12 months to maintain the operational safety and reliability of the product.



*Please observe the relevant information in the  
(→ Register 9: Maintenance)*

---

### CAUTION

Mechanical damage and damage to the system electrics due to improper use and excessive load on the system.

#### **Injury to operating personnel, patients or third persons and damage to the product!**

- ◆ If necessary, have the system checked more frequently.
  - ◆ Ensure that any defects are repaired professionally.
- 

### Image quality

Maintenance should include checking the image quality. Maintenance at regular intervals is recommended to always ensure best image quality.



*To ensure optimal image quality, have the following functions checked in particular as part of regular maintenance:*

*Pixelshift, image rotation, noise reduction, edge enhancement, subtraction, Roadmapping.*

### Performing maintenance

Maintenance work should be performed by trained technical personnel only. If you do not have a maintenance contract, please contact Siemens Customer Service.

If national laws or regulations specify more frequent checking and/or maintenance, this must be observed.

---

## Failures

In the event of malfunctions of the ARCADIS Avantic system, call SIEMENS Customer Service.

### *Error messages at the C-arm system*

When a malfunction is detected, the ARCADIS Avantic system is disabled. An error message is displayed on the control panel of the C-arm system:



In addition, a malfunction is also displayed on the left monitor:

- ☐ All vital system functions are automatically checked each time the ARCADIS Avantic is switched on.
- ☐ During routine operation, the ARCADIS Avantic is continuously monitored.
- ☐ Temporary error messages, such as No. 5901, can be canceled by pressing any button on the C-arm system (except vertical up/down movements and C-arm brakes).
- ☐ Non-temporary error messages, such as No. 5015 or 5016, cannot be canceled. If these errors occur, radiation release is no longer possible. Please notify Customer Service immediately.

Error messages 7309 (tube unit iris collimator) and 7409 (TV camera iris) are temporary error messages that can lead to unnecessary radiation exposure of the user and patient if treatment is continued.

If errors occur repeatedly, switch off the ARCADIS Avantic and notify Customer Service. Have the following information ready:

- ☐ Error number
- ☐ Operating mode selected
- ☐ Was radiation activated when the error occurred?
- ☐ Is the error related to an operating process?

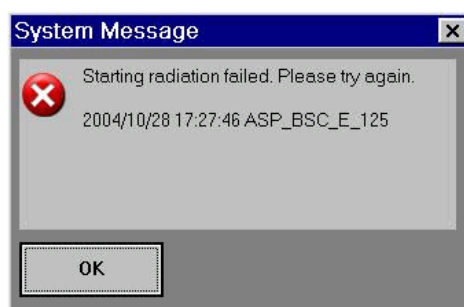


*In case of a malfunction or failure of the radiation indicator, please notify Siemens Customer Service.*

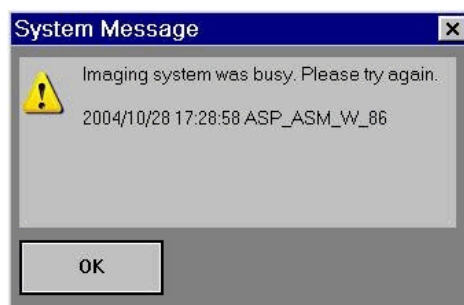
### *System messages on the monitor*

Three different types of system messages can appear on the monitor. The type of message is identified by a corresponding symbol (top left).

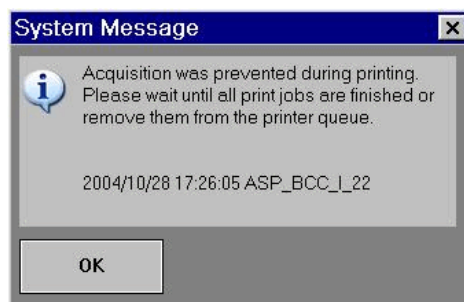
- ❑ Example of an error message:



- ❑ Example of a warning:



- ❑ Example of information:



You must confirm error messages with the **OK** button or the radiation release button to be able to resume your work. However, warnings and information do not disable radiation release.

### *Malfunction of electrics*

In case of danger for patients and operating personnel (e.g. if there is no live image on the monitor and the radiation indicator is on despite this) or danger for the product, you must disconnect the power plug immediately. The ARCADIS Avantic will be shut down completely and disconnected from the power supply. This will

- ☐ switch off radiation
- ☐ abort the current system program
- ☐ abort and cancel current operating sequences
- ☐ deleting all image information not saved to a hard disk.

Only after the cause of the hazard has been clearly identified and remedied may the system be reconnected to the power supply. In all other cases, e.g. system malfunction, contact Siemens Customer Service immediately.

### *Switching to emergency power supply*

If a power interruption lasts longer than 8 ms, the ARCADIS Avantic can switch off. In this case the ARCADIS Avantic must be switched on again after switching to the emergency power supply.

In case of a power failure, a signal sounds (up to 10 min.) when the system switches to uninterruptible power supply (UPS).

### *Disconnecting the power supply plug*

After disconnecting the power plug, voltage is supplied to the imaging system and the left monitor by the uninterruptible power supply (UPS) until the ARCADIS Avantic switches off completely.

When the plug is pulled out, switching to the uninterruptible power supply causes an acoustic signal to be emitted. The UPS switches off after 10 min. at the latest.



*As soon as mains supply is restored, the battery of the UPS is recharged.*

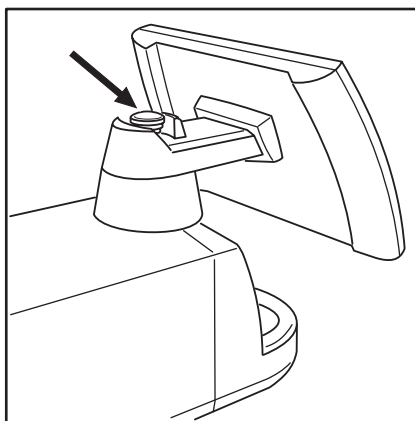
*Please remember that the UPS battery life is limited.*



---

## *Emergency STOP*

Please immediately press the red EMERGENCY STOP button (arrow) on the electronics unit of the C-arm system when a dangerous situation results from motorized movements.



- ☐ Motorized vertical movement is then disabled immediately.
- ☐ All other system functions remain unaffected by this.

Unlock the button only after the danger has clearly been eliminated.

- ☐ The button can be unlocked by gently turning it clockwise.

### *Fire protection*

---

#### **WARNING**

In case of fire

**A fire or smoldering fire can produce toxic gases or fumes!**

- ◆ Immediately switch off the ARCADIS Avantic.
  - ◆ Pull the power cable out of the wall outlet.
  - ◆ Inform all personnel of the correct procedures in case of fire as part of occupational safety training.
- 

Please inform our Customer Service prior to starting up the ARCADIS Avantic again as it may require refurbishing due to damage caused by fire.

### *Explosion protection*

---

#### **WARNING**

Ignitable concentration of anesthetic gases in the examination room.

**Explosion hazard!**

- ◆ The ARCADIS Avantic must not be operated in such an environment.
-

---

## Overload protection

Prolonged continuous radiation at maximum tube load is permissible in fluoroscopy mode. However, this can cause the X-ray tube assembly to heat up. For this reason, the X-ray tube assembly has a thermal monitor. If necessary, power is reduced in all operating modes, in SUB/Roadmap with the next new scene/mask.

---

### CAUTION

Heating up of the X-ray tube assembly due to continuous radiation

#### Burns of the skin may occur!

- ◆ At a temperature of  $\geq 50\text{ °C}$  the single-tank housing must not come into contact with the patient's skin.

---

The following operating states can occur:

If the temperature rises to  $\geq 50\text{ °C}$  or if a certain power limit of the X-ray tube is exceeded:

- ☐ the temperature indicator on the control panel of the C-arm system lights up.
- ☐ the LED on the key for high-contrast fluoroscopy flashes.
- ☐ the imaging system displays a message in the status bar.
- ☐ the system switches to characteristic SR1.
- ☐ the previously set characteristic can be reselected for each new radiation request by actuating the **High Contrast** key. On actuation of the key an acoustic alarm sounds (4- beeps).
- ☐ all radiation for which the previously set characteristic was reselected is counted.

If the temperature rises to  $\geq 60\text{ °C}$  or if a certain power limit of the X-ray tube is exceeded:

- ☐ the temperature indicator on the control panel of the C-arm system flashes continuously.
- ☐ the LED on the key for high-contrast fluoroscopy flashes.
- ☐ the imaging system displays a message in the status bar.
- ☐ the system switches to characteristic SR2 and the maximum frame rate in the PFC and DCM modes is reduced by one step.
- ☐ the previously set characteristic can be reselected for each new radiation request by actuating the **High Contrast** key. On actuation of the key an acoustic alarm sounds (4- beeps).
- ☐ all radiation for which the previously set characteristic was reselected is counted.

If the temperature rises to  $\geq 70^{\circ}\text{C}$  or if the maximum power stage is exceeded:

- ❑ radiation is aborted and cannot be released again.
- ❑ the kV/mA display flashes no later than 30 s after radiation is disabled.
- ❑ a message window is displayed on the imaging system.

If a third power limit value is exceeded at a temperature of  $< 70^{\circ}\text{C}$ , radiation release is still possible. On actuation of the **High Contrast** key, you can switch over to characteristic SR1 for the next radiation cycle. This is indicated by an acoustic signal (8 beeps).

---

## *Personal safety*

### *Open heart and skull examinations*

If an approved system is used alone or with other equipment for cardiac or cranial examinations, a conductive connection must be made between the system and a potential equalization point, e.g. the tabletop.  
(→ Register 2: System Description: page 10)

Only then may the patient be connected to the device.

### *Crushing hazards on the C-arm system*

Correct handling of the C-arm system requires that operating personnel and patients use only the grips provided for this purpose. Where this is not possible, monitor the points of potential crush injury between movable system parts and their guide openings.

---

#### **WARNING**

Moving and braking the C-arm (see Fig. 1).

##### **Risk of crushing hands!**

- ◆ Please make sure that your hands are not in the travel path of system parts.

---

#### **WARNING**

Maximum lowering of the C-arm (see Fig. 2)

##### **Risk of crushing feet!**

- ◆ Please watch your feet when the C-arm is being lowered fully, since there may not be sufficient clearance left between the I.I. and the floor.

---

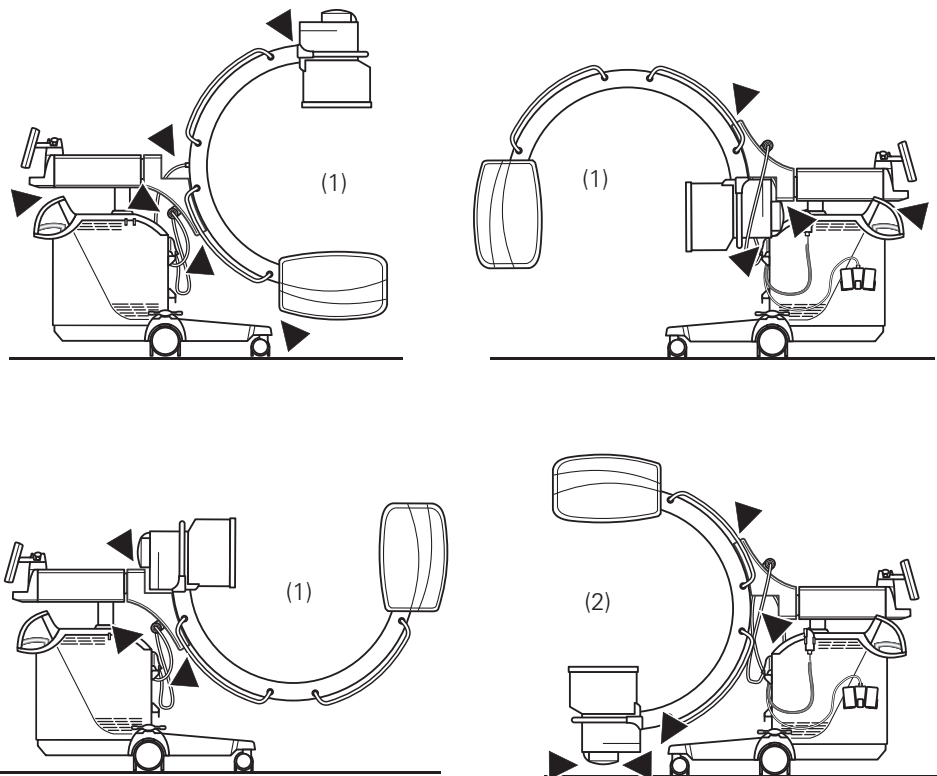
## WARNING

Maximum lowering of the C-arm (see Fig. 2)

**Radiation can be released inadvertently!**

- ◆ Please make sure that the footswitch is not located underneath the C-arm.

The system areas marked in the drawings indicate points of crushing or impact hazards for the patient or operating personnel.



(1) Potential danger points when moving and braking the C-arm

(2) Potential danger points when the C-arm is lowered fully

---

## *Crushing hazards on the monitor trolley*

Your monitor trolley can optionally be equipped with a printer.

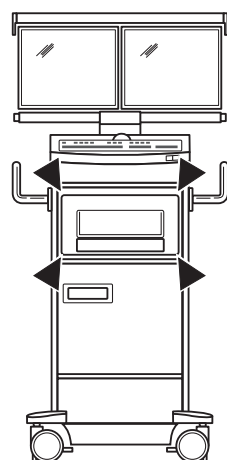
---

### **CAUTION**

Moving the printer out or in

#### **Risk of crushing hands!**

- ◆ Mind your hands when moving the printer out of or into its location.
- 



## *Mechanical damage*

To avoid injuries to the patient, operating personnel or third parties, mechanical damage to the system must be repaired by authorized service personnel.

## *Radiation protection*

Automatic dose rate control contributes considerably to the reduction of radiation exposure for the patient and the operator.

Nevertheless, observe the following important notes in order to keep the dose absorbed by the patient as low as possible.

### **For the patient**

- ☐ Keep the radiation field as small as possible.
- ☐ Provide the best possible protection for reproductive organs (gonad protective caps or lead-rubber covers) during exposure in the vicinity of these organs.

### **For the operating personnel**

- ☐ When releasing the exposure, the operator must keep a sufficient safety distance from the X-ray tube assembly.
- ☐ Wear protective clothing in the control area during an examination.
- ☐ Wear a radiation-monitoring badge or use a pen dosimeter.

### **For patients and operating personnel**

- ☐ Keep the fluoroscopic time as short as possible.
- ☐ Maintain the maximum possible source-skin distance.



*Additional objects in the beam path may result in increased scattered radiation.*

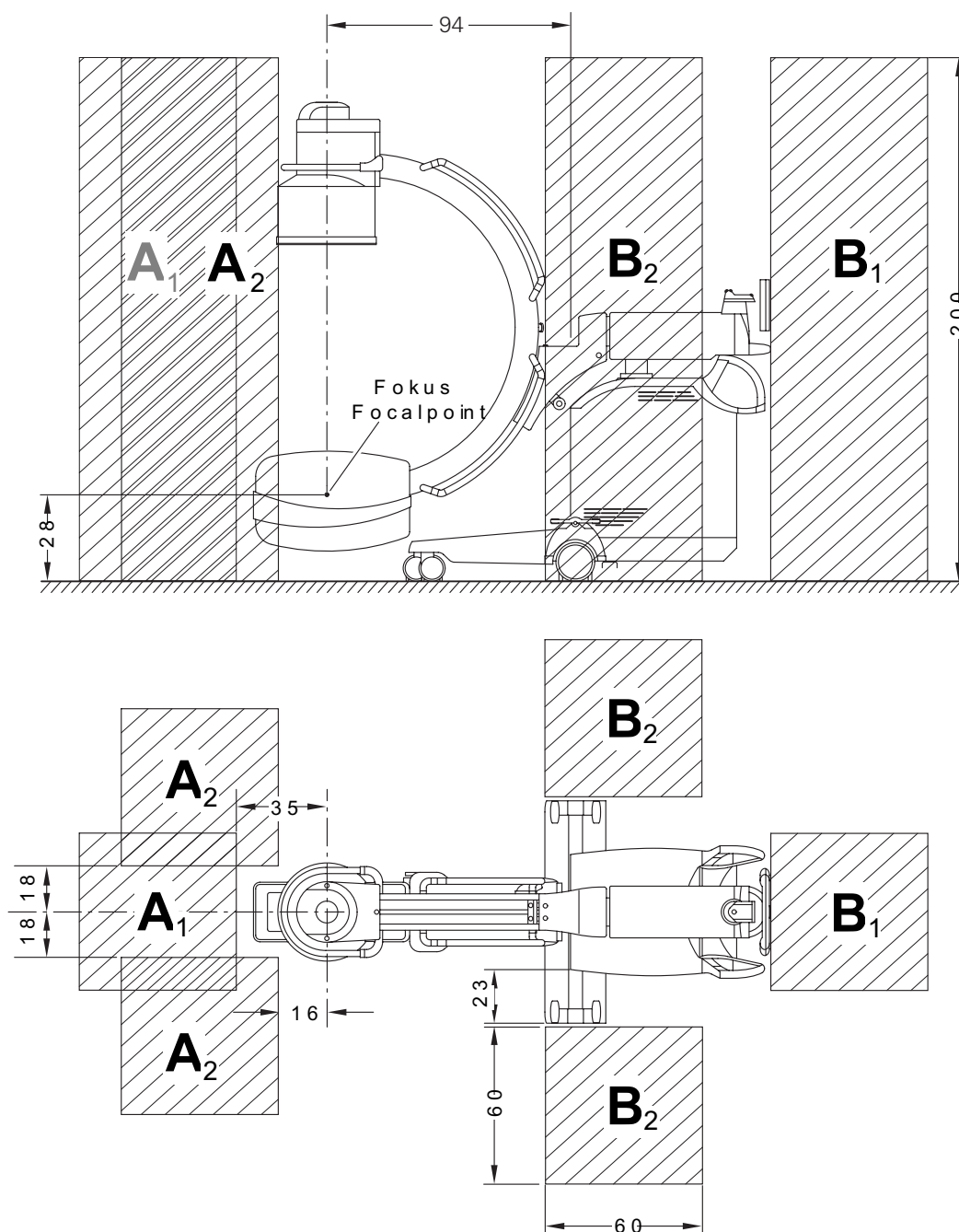


*Please be aware that certain materials in the X-ray beam (e.g. parts of an operating table) may impair the X-ray image due to imaging of contours and inclusions in these materials. In rare cases this can result in incorrect diagnosis. This material may also lead to higher radiation exposure.*



## *Location and size of the relevant operating areas*

### *X-ray tube assembly at the bottom*

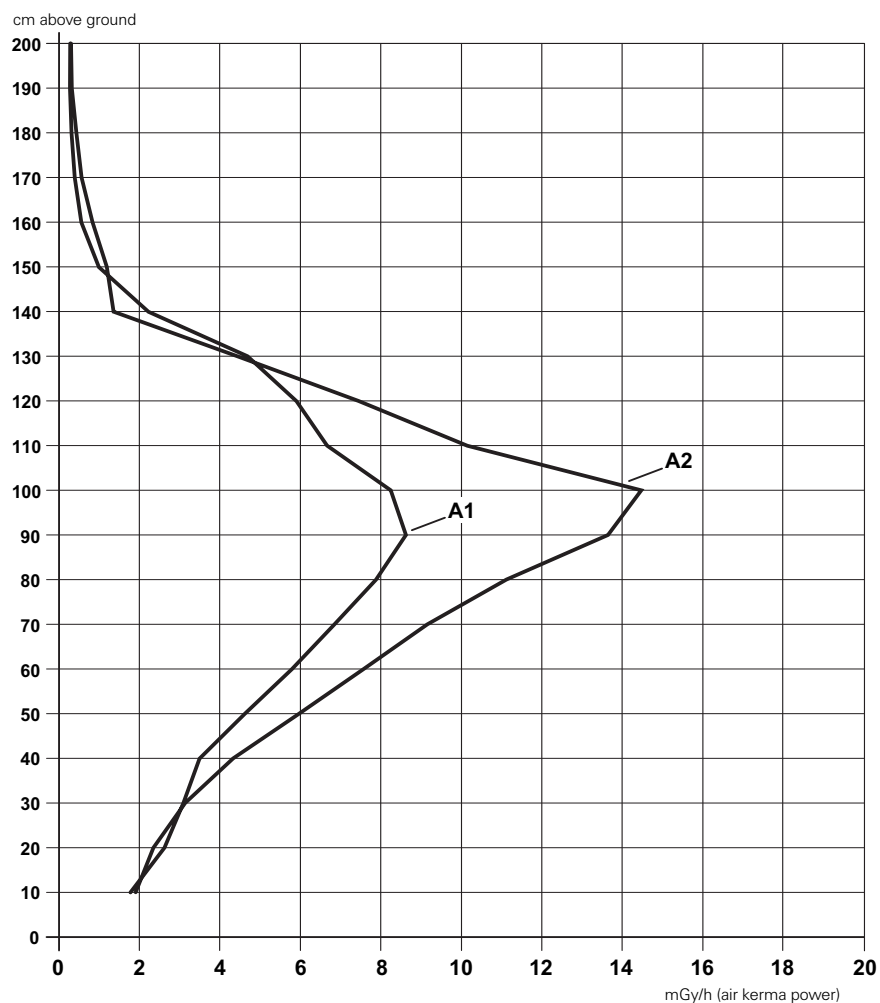


Scattered radiation in the main operating area according to EN 60601-1-3

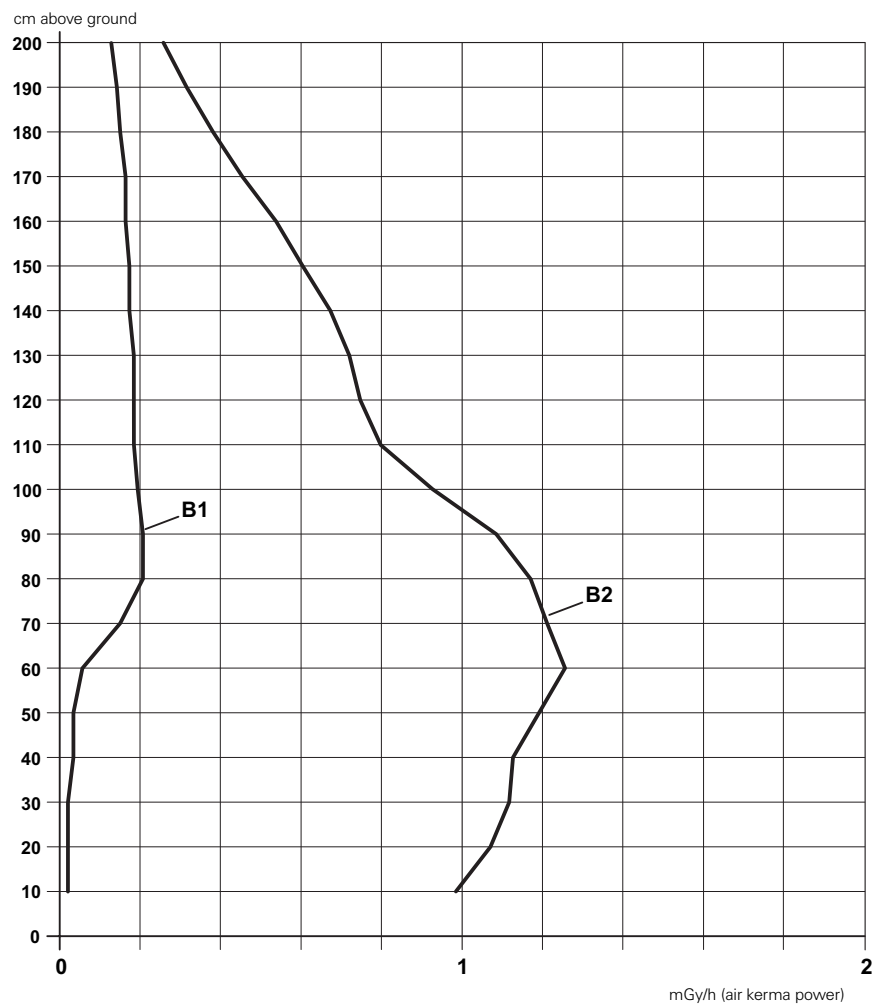
Height above floor [cm]	Measure- ment A1 [mGy/h]	Measure- ment A2 [mGy/h]	Measure- ment B1 [mGy/h]	Measure- ment B2 [mGy/h]
10	1,7604	1,9224	0,0216	0,9828
20	2,6244	2,3544	0,0216	1,0692
30	3,1068	3,1428	0,0216	1,116
40	3,5028	4,3524	0,0324	1,1232
50	4,6188	5,9508	0,0324	1,188
60	5,8032	7,5924	0,054	1,2528
70	6,858	9,1476	0,1512	1,2096
80	7,8912	11,142	0,2052	1,1664
90	8,6184	13,6188	0,2052	1,0872
100	8,2872	14,4612	0,1944	0,9288
110	6,6312	10,1304	0,1836	0,7992
120	5,94	7,4592	0,1836	0,7452
130	4,7088	4,41	0,1836	0,72
140	2,2356	1,3716	0,1728	0,6732
150	0,9828	1,1772	0,1728	0,6048
160	0,5472	0,8316	0,162	0,54
170	0,3996	0,5652	0,162	0,4536
180	0,3348	0,4428	0,1512	0,378
190	0,2808	0,3348	0,1404	0,3132
200	0,2592	0,27	0,1296	0,2592

Tolerance of air kerma measurements  $\pm 5\%$

- ☐ Measurement A1: Operating area A1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the bottom, with scattered radiation grid
- ☐ Measurement A2: Operating area A2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the bottom, with scattered radiation grid
- ☐ Measurement B1: Operating area B1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the bottom, with scattered radiation grid
- ☐ Measurement B2: Operating area B2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the bottom, with scattered radiation grid

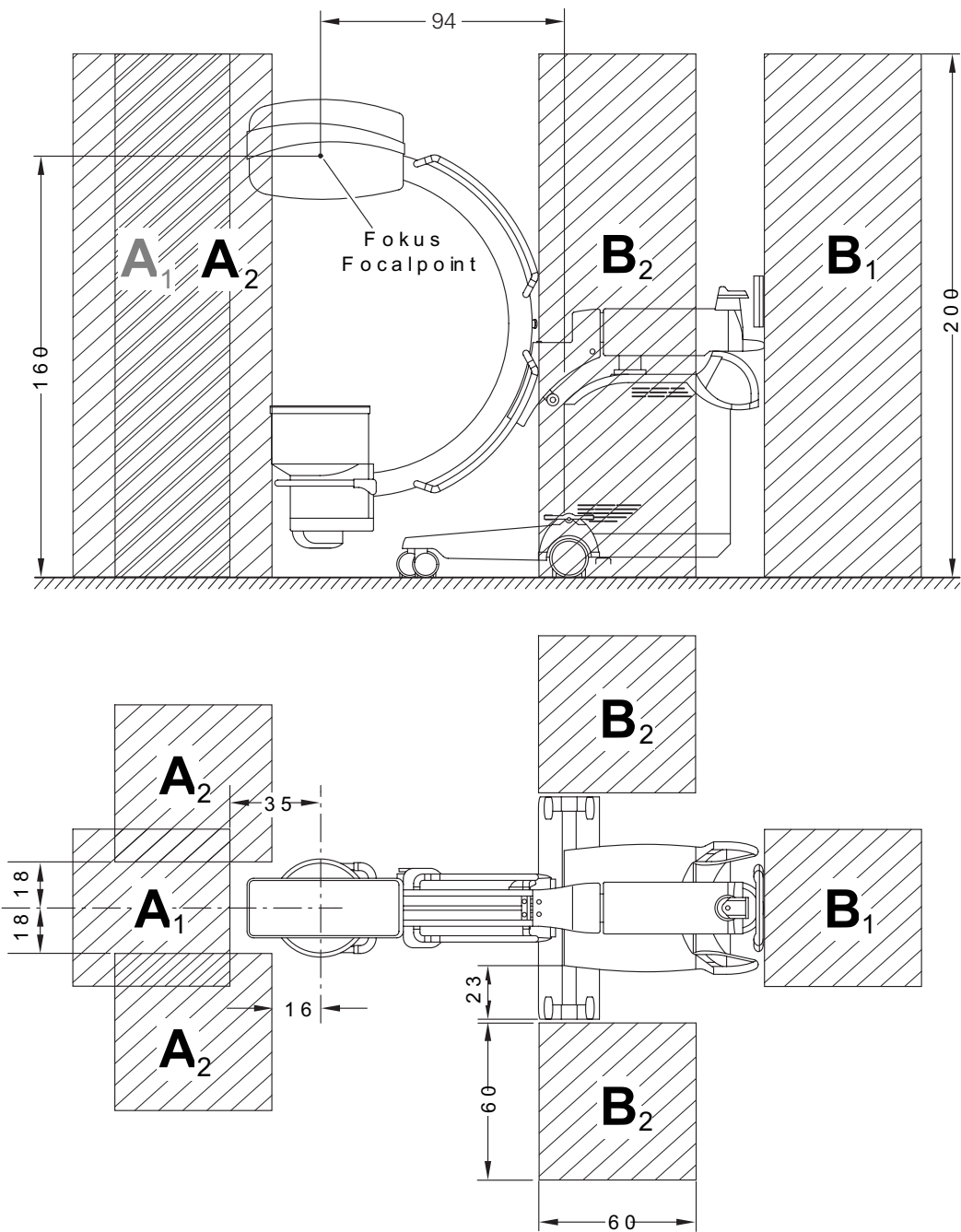


- ☐ Measurement A1  
continuous fluoroscopy 125 kV, 3.2 mA
- ☐ Measurement A2  
continuous fluoroscopy 125 kV, 3.2 mA



- ❑ Measurement B1  
continuous fluoroscopy 125 kV, 3.2 mA
- ❑ Measurement B2  
continuous fluoroscopy 125 kV, 3.2 mA

*X-ray tube assembly at the top*

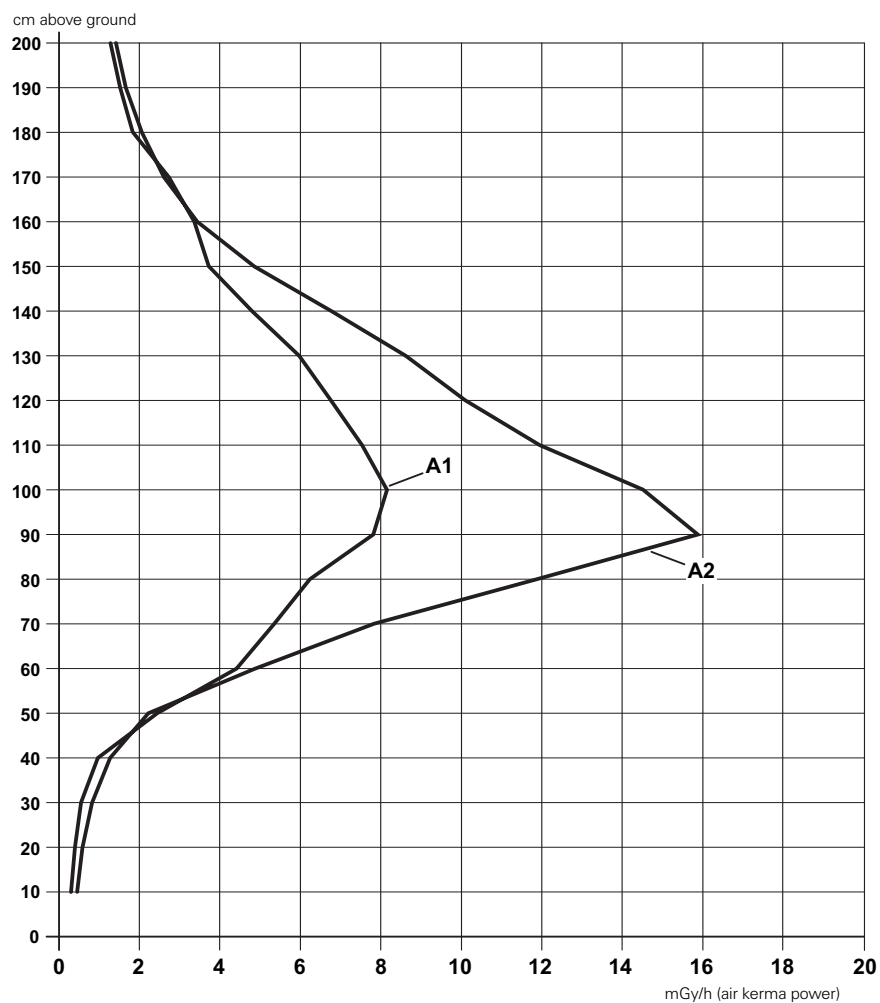


Scattered radiation in the main operating area according to EN 60601-1-3

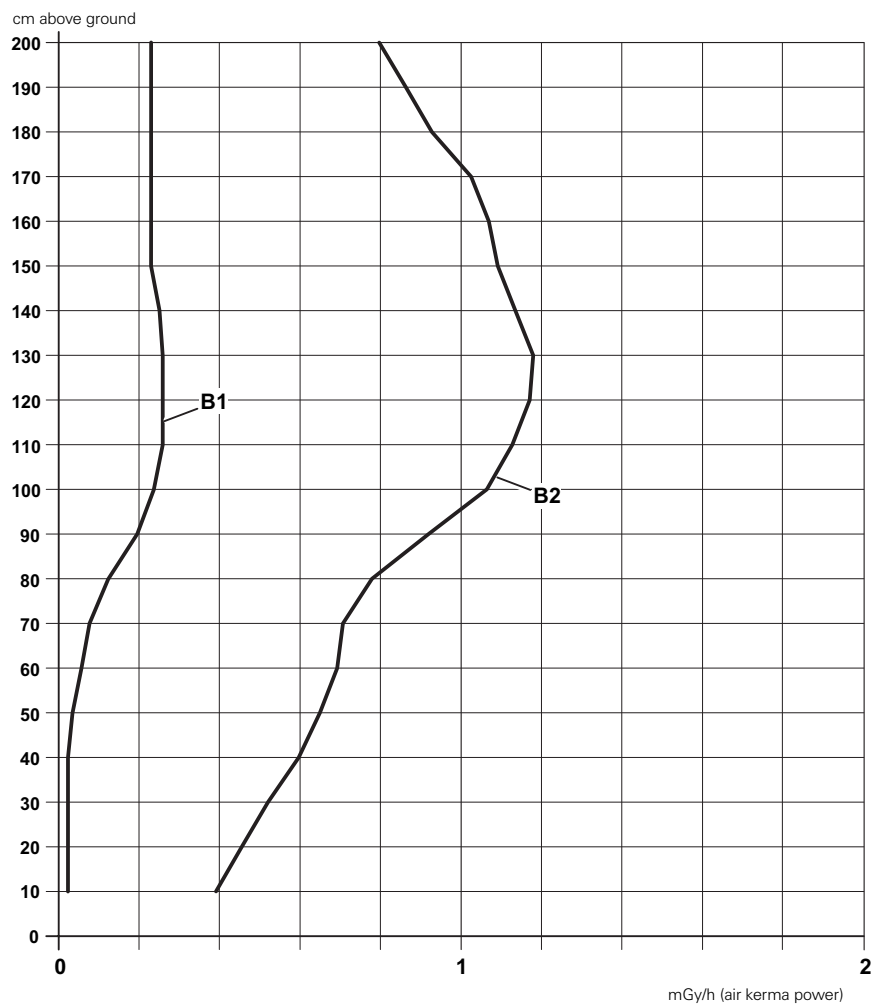
Height above floor [cm]	Measure- ment A1 [mGy/h]	Measure- ment A2 [mGy/h]	Measure- ment B1 [mGy/h]	Measure- ment B2 [mGy/h]
10	0,3132	0,4968	0,0216	0,3888
20	0,378	0,6048	0,0216	0,4536
30	0,5508	0,8316	0,0216	0,5184
40	0,9612	1,2636	0,0216	0,594
50	2,3976	2,2032	0,0324	0,648
60	4,4028	4,8636	0,054	0,6876
70	5,346	7,7868	0,0756	0,702
80	6,2352	11,8692	0,1188	0,774
90	7,8264	15,8868	0,1944	0,918
100	8,1324	14,562	0,2376	1,0584
110	7,5672	11,9736	0,2592	1,1232
120	6,7428	10,1412	0,2592	1,1664
130	5,9868	8,6472	0,2592	1,1772
140	4,806	6,7824	0,2484	1,134
150	3,7296	4,9032	0,2268	1,0908
160	3,3732	3,474	0,2268	1,0692
170	2,7288	2,6208	0,2268	1,026
180	1,8252	2,0736	0,2268	0,9288
190	1,5372	1,6848	0,2268	0,864
200	1,3284	1,4148	0,2268	0,7992

Tolerance of air kerma measurements  $\pm 5\%$

- ☐ Measurement A1: Operating area A1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid
- ☐ Measurement A2: Operating area A2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid
- ☐ Measurement B1: Operating area B1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid
- ☐ Measurement B2: Operating area B2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly at the top, with scattered radiation grid



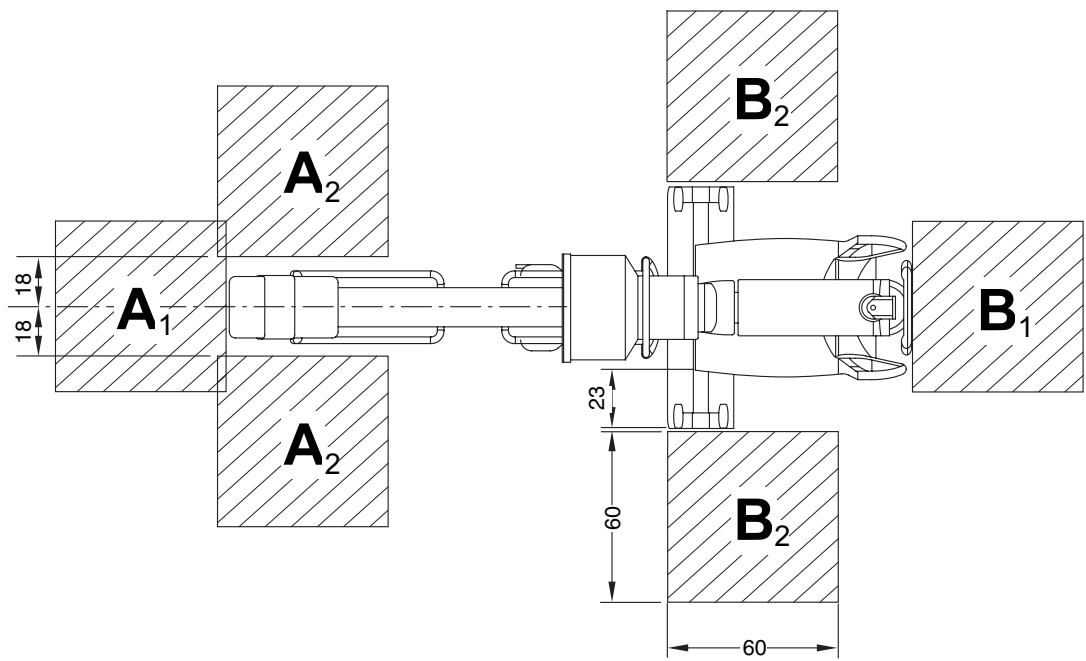
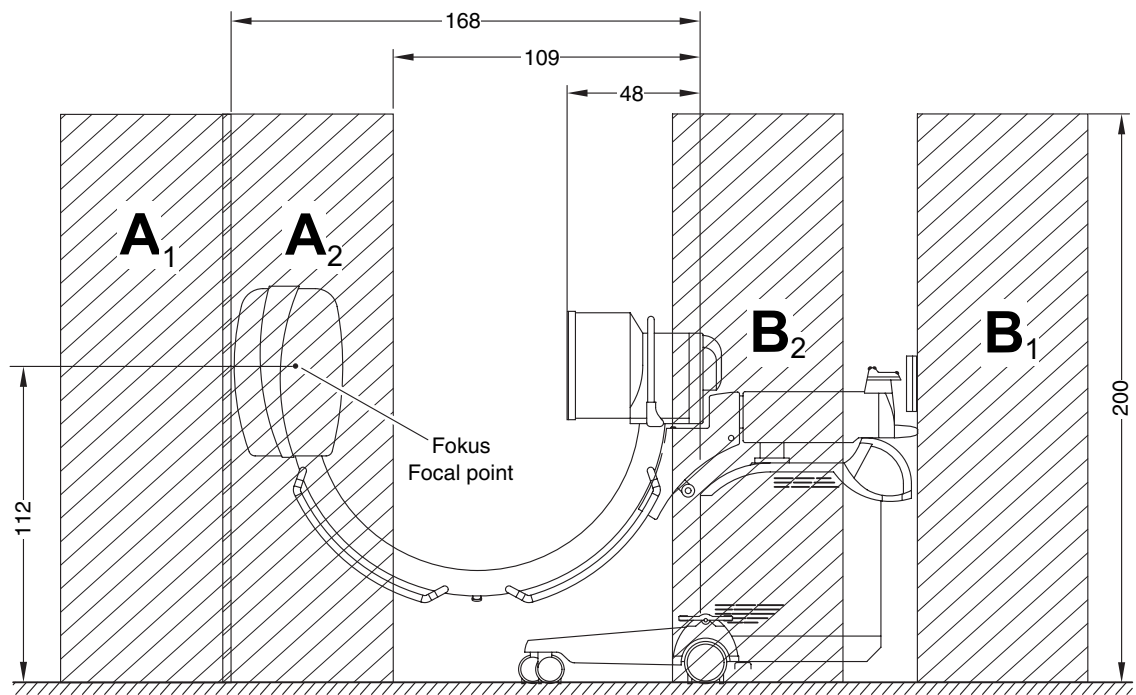
- Measurement A1  
continuous fluoroscopy 125 kV, 3.2 mA
- Measurement A2  
continuous fluoroscopy 125 kV, 3.2 mA



- ☐ Measurement B1  
continuous fluoroscopy 125 kV, 3.2 mA
- ☐ Measurement B2  
continuous fluoroscopy 125 kV, 3.2 mA



*X-ray tube assembly horizontal*

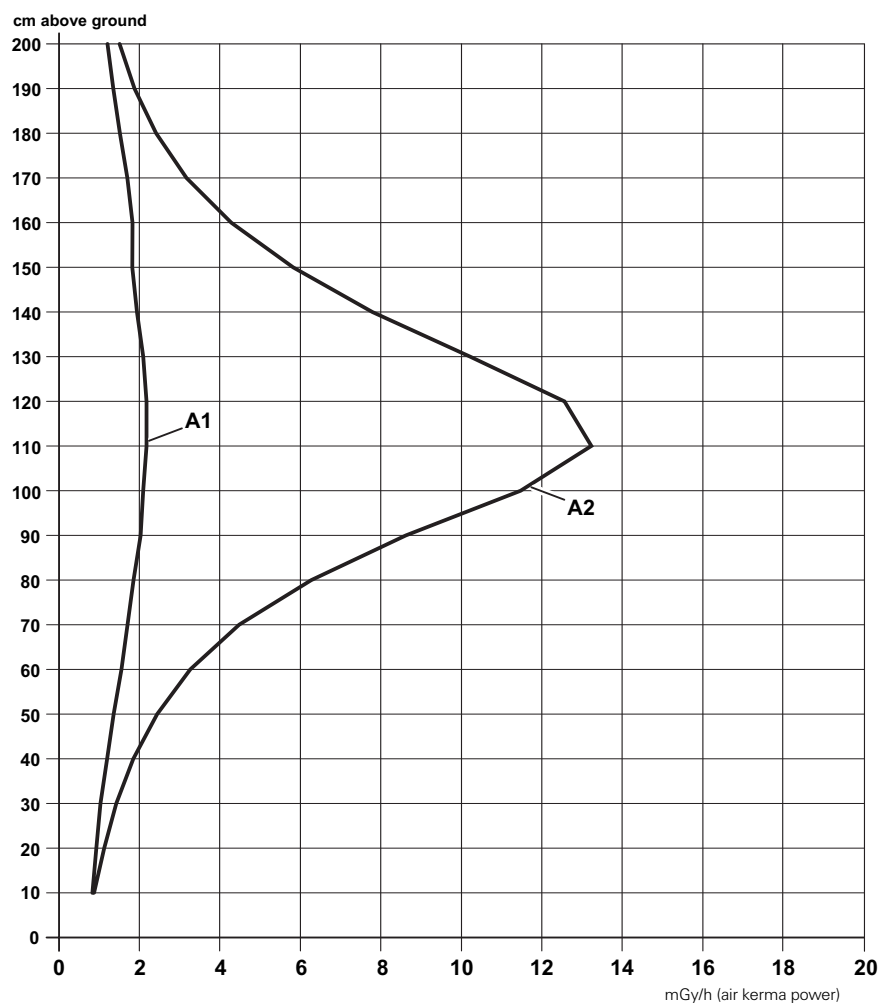


Scattered radiation in the main operating area according to EN 60601-1-3

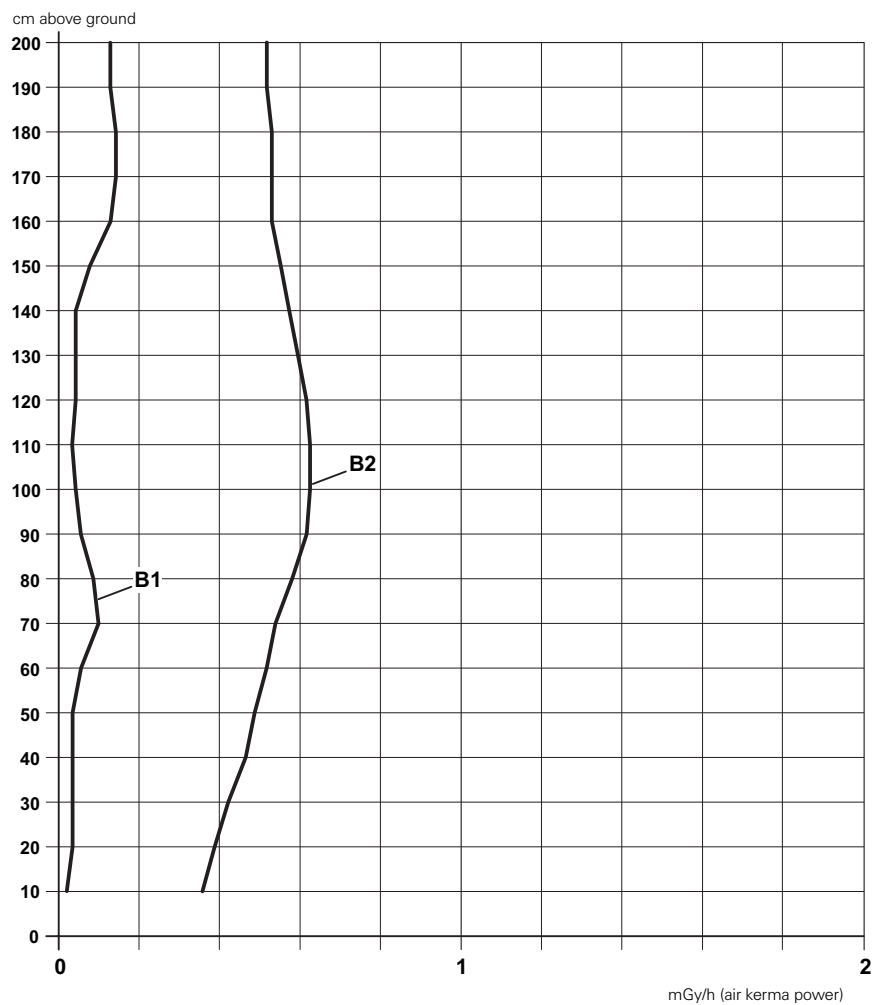
Height above floor [cm]	Measure- ment A1 [mGy/h]	Measure- ment A2 [mGy/h]	Measure- ment B1 [mGy/h]	Measure- ment B2 [mGy/h]
10	0,8424	0,8856	0,0216	0,3564
20	0,9396	1,1232	0,0324	0,3888
30	1,0584	1,4256	0,0324	0,4212
40	1,1988	1,8576	0,0324	0,4644
50	1,3608	2,43	0,0324	0,486
60	1,5336	3,2616	0,054	0,5184
70	1,6956	4,5144	0,0972	0,54
80	1,8576	6,2676	0,0864	0,5832
90	2,0196	8,5968	0,054	0,6156
100	2,0916	11,4156	0,0432	0,6264
110	2,1816	13,2156	0,0324	0,6264
120	2,1816	12,5604	0,0432	0,6156
130	2,0952	10,206	0,0432	0,594
140	1,9332	7,8372	0,0432	0,5724
150	1,8036	5,8068	0,0756	0,5508
160	1,836	4,2876	0,1296	0,5292
170	1,6956	3,1968	0,1404	0,5292
180	1,5228	2,43	0,1404	0,5292
190	1,3392	1,89	0,1296	0,5184
200	1,1916	1,5228	0,1296	0,5184

Tolerance of air kerma measurements  $\pm 5\%$

- ☐ Measurement A1: Operating area A1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm horizontal, X-ray tube assembly horizontal, with scattered radiation grid
- ☐ Measurement A2: Operating area A2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm horizontal, X-ray tube assembly horizontal, with scattered radiation grid
- ☐ Measurement B1: Operating area B1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm horizontal, X-ray tube assembly horizontal, with scattered radiation grid
- ☐ Measurement B2: Operating area B2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm horizontal, X-ray tube assembly horizontal, with scattered radiation grid

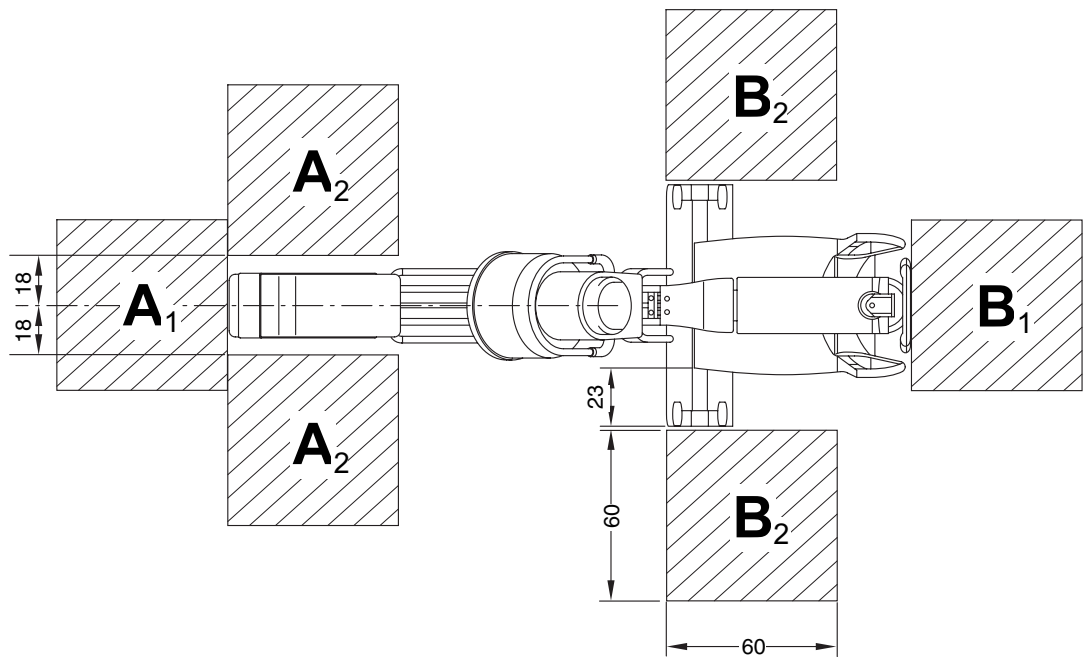
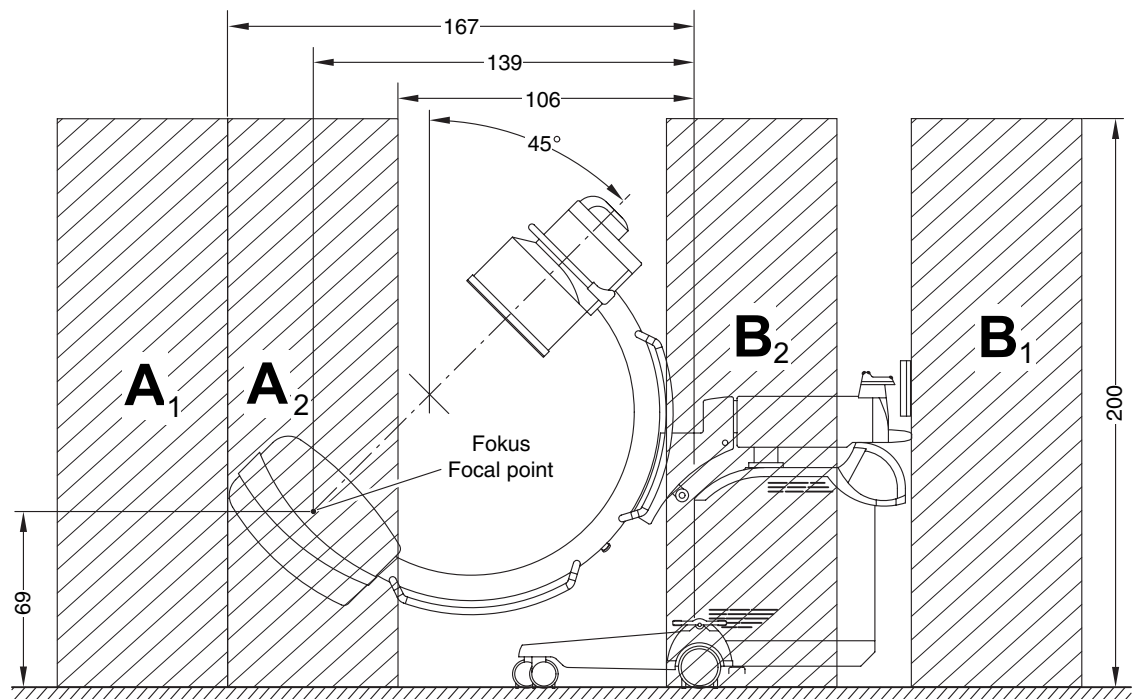


- ❑ Measurement A1  
continuous fluoroscopy 125 kV, 3.2 mA
- ❑ Measurement A2  
continuous fluoroscopy 125 kV, 3.2 mA



- ☐ Measurement B1  
continuous fluoroscopy 125 kV, 3.2 mA
- ☐ Measurement B2  
continuous fluoroscopy 125 kV, 3.2 mA

*X-ray tube assembly lateral 45°*

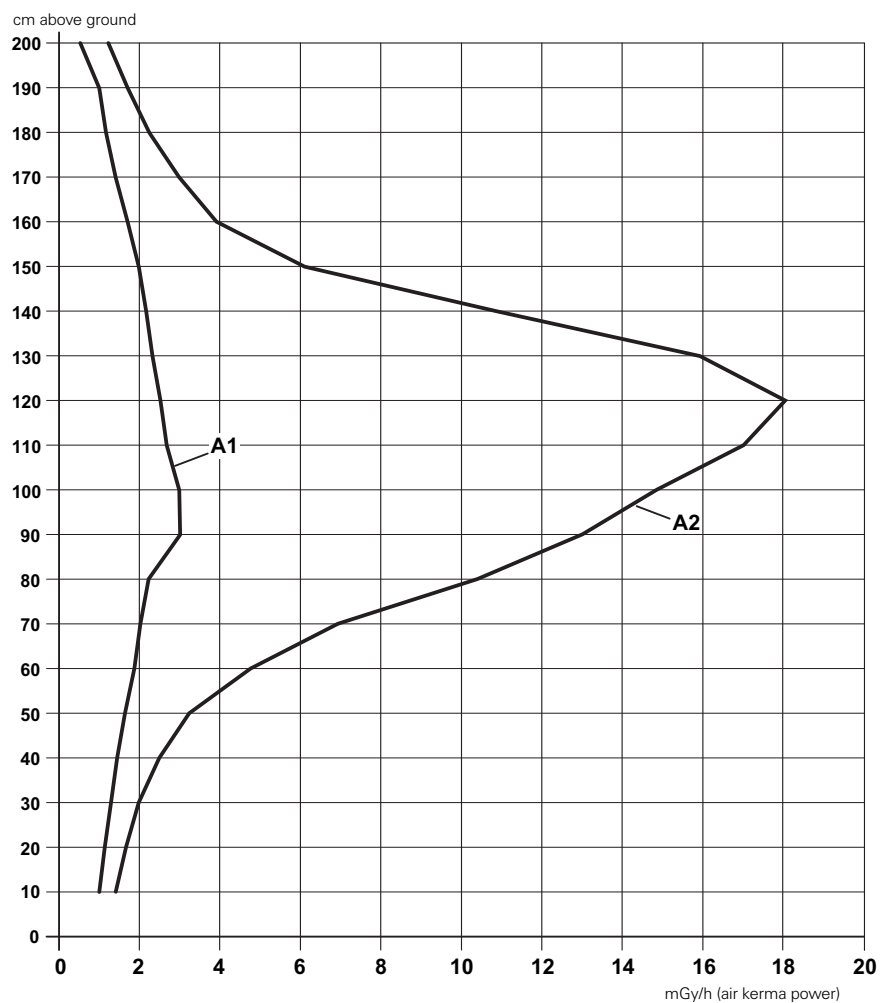


Scattered radiation in the main operating area according to EN 60601-1-3

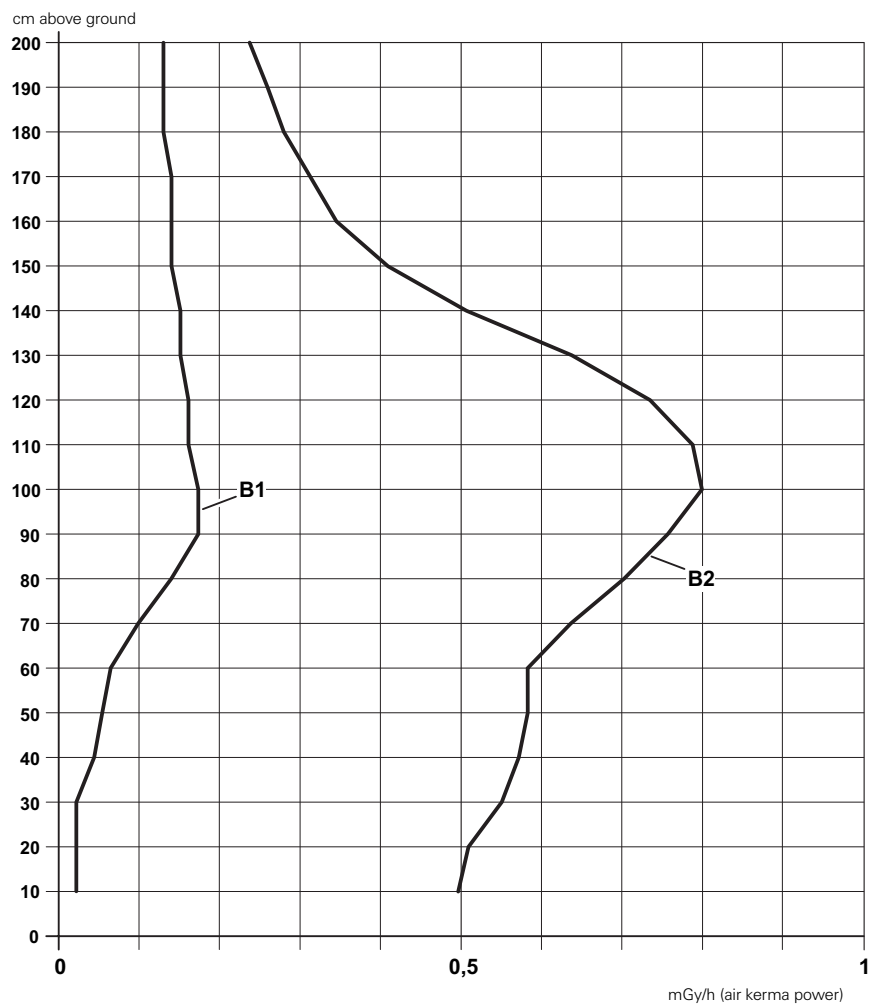
Height above floor [cm]	Measurement A1 [mGy/h]	Measurement A2 [mGy/h]	Measurement B1 [mGy/h]	Measurement B2 [mGy/h]
10	0,9936	1,4472	0,0216	0,4968
20	1,134	1,6416	0,0216	0,5076
30	1,2852	1,9656	0,0216	0,5508
40	1,4472	2,4876	0,0432	0,5724
50	1,6308	3,2472	0,054	0,5832
60	1,836	4,7736	0,0648	0,5832
70	2,0196	6,9516	0,0972	0,6372
80	2,214	10,4544	0,1404	0,702
90	2,9952	13,0104	0,1728	0,756
100	2,9556	14,8716	0,1728	0,7992
110	2,6784	17,0316	0,162	0,7884
120	2,5056	18,0828	0,162	0,7344
130	2,332	15,9228	0,1512	0,6372
140	2,1708	10,8864	0,1512	0,5076
150	1,9548	6,1776	0,1404	0,4104
160	1,6848	3,9276	0,1404	0,3456
170	1,404	2,9592	0,1404	0,3132
180	1,1556	2,2356	0,1296	0,2808
190	0,9504	1,6884	0,1296	0,2592
200	0,5292	1,2528	0,1296	0,2376

Tolerance of air kerma measurements  $\pm 5\%$

- ☐ Measurement A1: Operating area A1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly lateral 45°, with scattered radiation grid
- ☐ Measurement A2: Operating area A2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly lateral 45°, with scattered radiation grid
- ☐ Measurement B1: Operating area B1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly lateral 45°, with scattered radiation grid
- ☐ Measurement B2: Operating area B2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, X-ray tube assembly lateral 45°, with scattered radiation grid



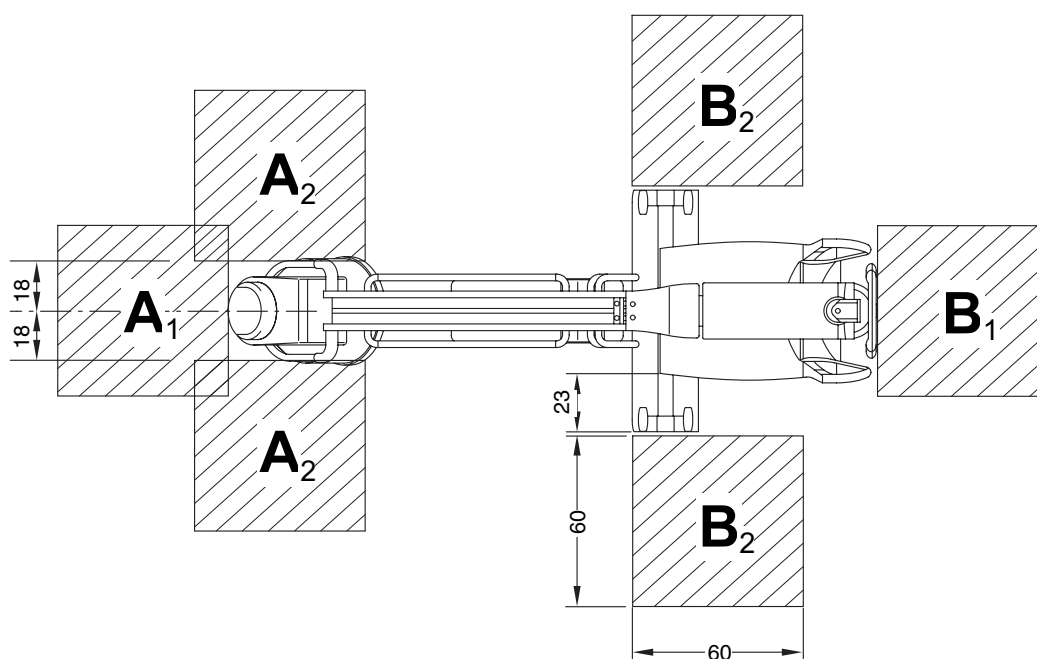
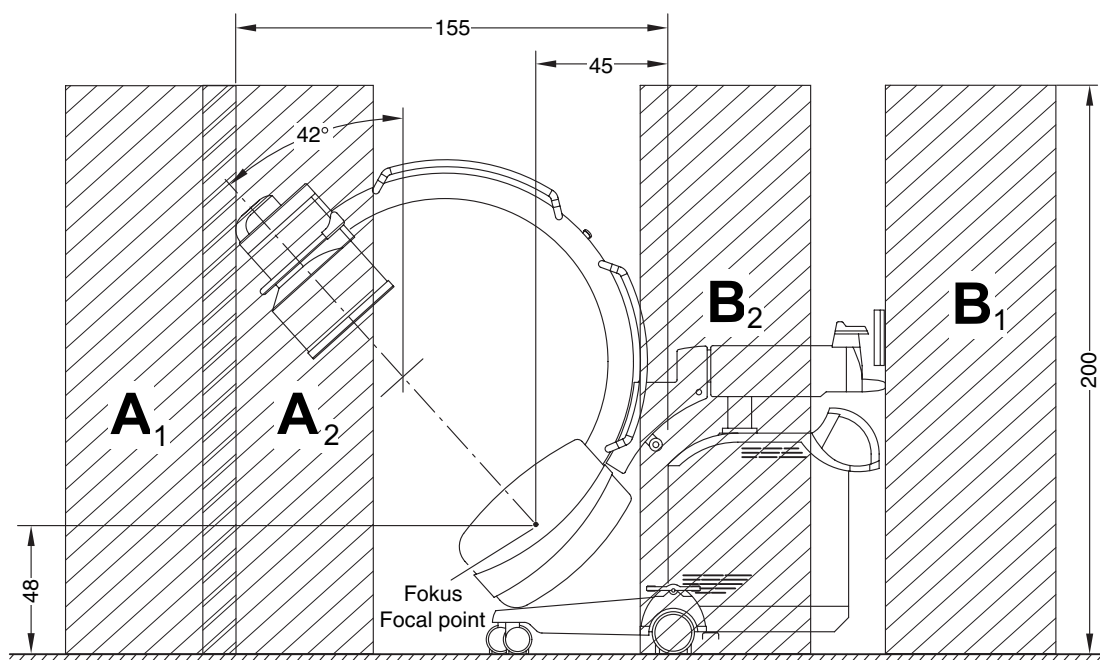
- Measurement A1  
continuous fluoroscopy 125 kV, 3.2 mA
- Measurement A2  
continuous fluoroscopy 125 kV, 3.2 mA



- ☐ Measurement B1  
continuous fluoroscopy 125 kV, 3.2 mA
- ☐ Measurement B2  
continuous fluoroscopy 125 kV, 3.2 mA



*Image intensifier lateral 42°*

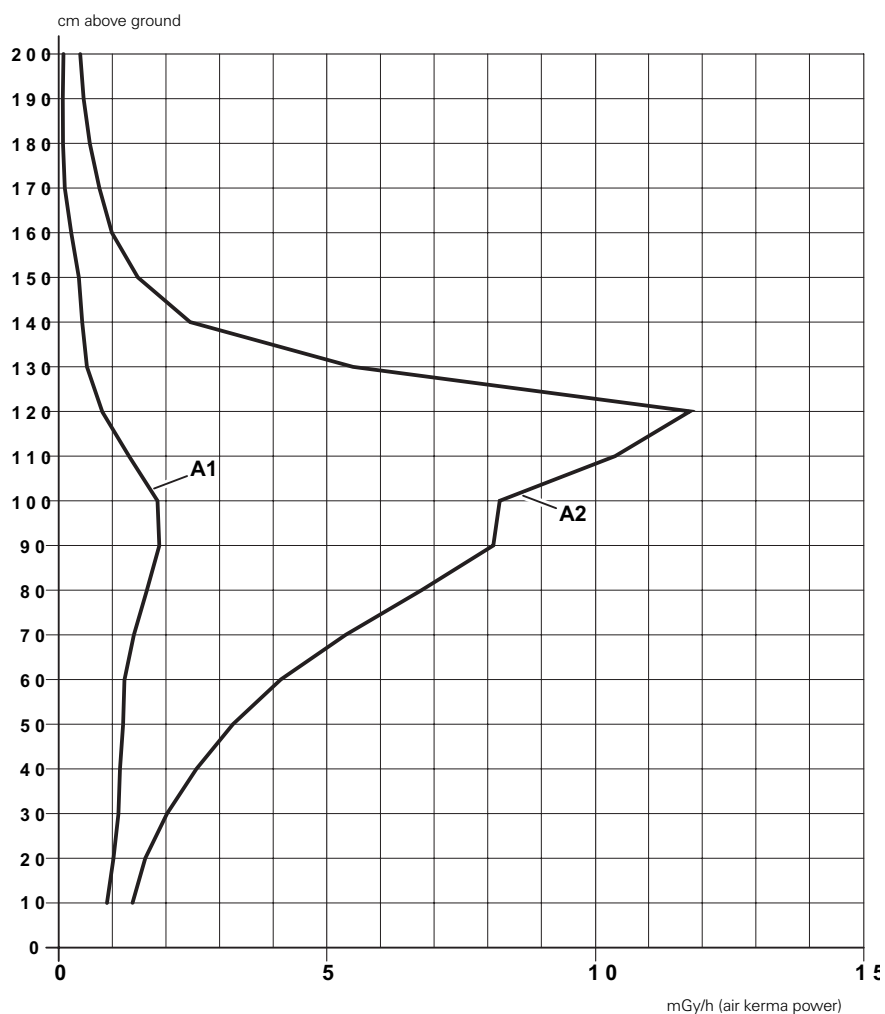


Scattered radiation in the main operating area according to EN 60601-1-3

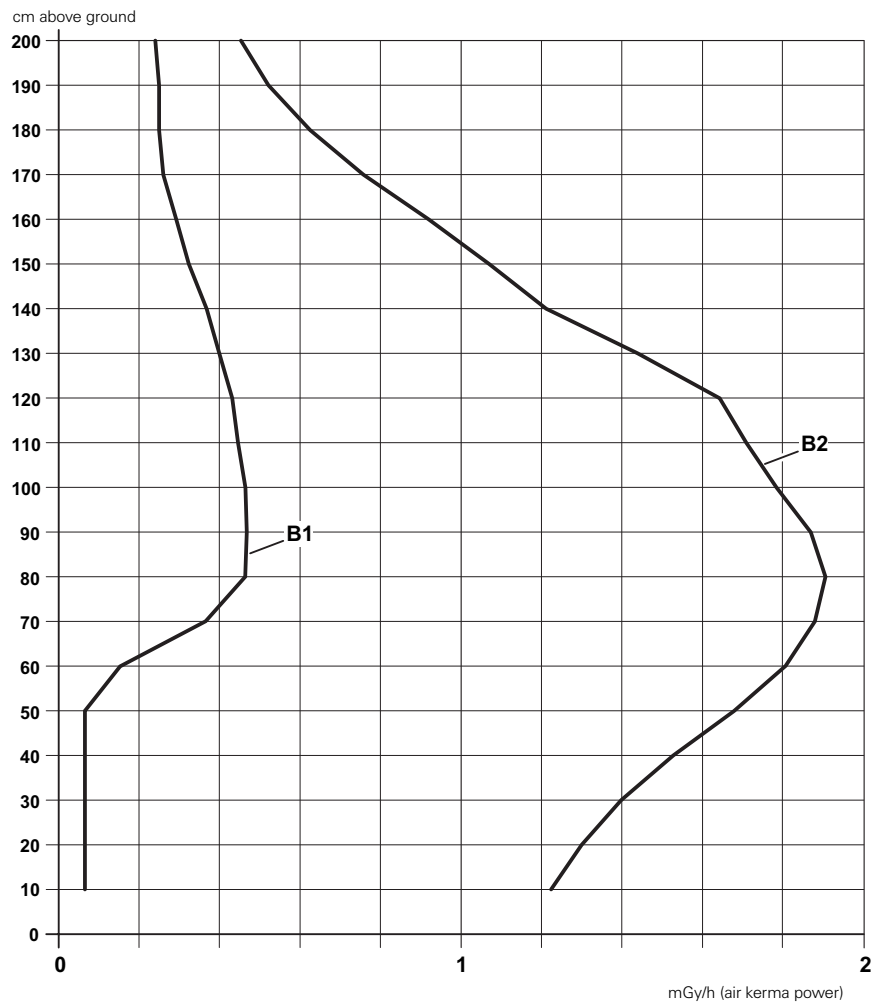
Height above floor [cm]	Measure- ment A1 [mGy/h]	Measure- ment A2 [mGy/h]	Measure- ment B1 [mGy/h]	Measure- ment B2 [mGy/h]
10	0,9072	1,3716	0,0648	1,2204
20	1,0152	1,62	0,0648	1,296
30	1,1016	2,0088	0,0648	1,3932
40	1,1556	2,5596	0,0648	1,5228
50	1,2096	3,2292	0,0648	1,674
60	1,242	4,1364	0,1512	1,8036
70	1,404	5,3244	0,3636	1,8792
80	1,6524	6,75	0,4644	1,9008
90	1,8684	8,0892	0,468	1,8684
100	1,836	8,19	0,4644	1,782
110	1,3176	10,3356	0,4428	1,7064
120	0,8136	11,7396	0,432	1,6416
130	0,5292	5,5404	0,3996	1,4364
140	0,4536	2,4948	0,3672	1,2096
150	0,3888	1,4796	0,324	1,0692
160	0,2484	1,0044	0,2916	0,918
170	0,1044	0,7596	0,2592	0,756
180	0,0864	0,5832	0,2484	0,6264
190	0,0756	0,4752	0,2484	0,5184
200	0,0864	0,3996	0,2412	0,4536

Tolerance of air kerma measurements  $\pm 5\%$

- ☐ Measurement A1: Operating area A1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, image intensifier lateral 42°, with scattered radiation grid
- ☐ Measurement A2: Operating area A2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, image intensifier lateral 42°, with scattered radiation grid
- ☐ Measurement B1: Operating area B1  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, image intensifier lateral 42°, with scattered radiation grid
- ☐ Measurement B2: Operating area B2  
continuous fluoroscopy 125 kV, 3.2 mA; C-arm vertical, image intensifier lateral 42°, with scattered radiation grid



- ❑ Measurement A1  
continuous fluoroscopy 125 kV, 3.2 mA
- ❑ Measurement A2  
continuous fluoroscopy 125 kV, 3.2 mA



- ❑ Measurement B1  
continuous fluoroscopy 125 kV, 3.2 mA
- ❑ Measurement B2  
continuous fluoroscopy 125 kV, 3.2 mA

### *Radiation interruption for all operating modes*

The hand switch as well as the footswitch are designed as push buttons. By releasing the respective operating element, radiation in fluoroscopy mode is interrupted immediately or on completion of the storage image.

---

## *Equipment safety*

### *Positioning the C-arm*

The maneuverability of the C-arm may cause the image intensifier or single tank to collide with the patient or the patient table when the ARCADIS Avantic is not operated as specified.

#### **Safety stop for horizontal movement**

If the C-arm is in an unfavorable horizontal position (support arm in the inner area 0-8), there is a danger of collision between the image intensifier/single tank and the base of the C-arm system during orbital movements. This can cause damage to the components affected.

For this reason the zero position for moving the support arm has a safety stop. You will therefore have to override a slight resistance at the 0 position, if you want to move the support arm from the outer area (12-0) into the collision area (0-8).

#### **Brakes**

Make sure the brakes are applied after adjusting the C-arm position.

#### **Transport**

When moving or transporting the C-arm system please take special care that the system parts do not collide with an obstacle. This could also result in accidental radiation release or an impairment of the image quality under certain circumstances.

### *Installation, repair*

Modifications or upgrades to the product must comply with legal regulations as well as generally accepted engineering standards.

As manufacturer, SIEMENS will not be held responsible for the safety features, reliability and performance of the product if:

- ☐ the product is used in a manner other than that specified in the Operator Manual;
- ☐ installation, upgrades, resetting or repairs are performed by personnel not authorized by Siemens.
- ☐ components affecting product safety are not replaced with original Siemens spare parts.
- ☐ the electrical wiring in the rooms containing the system does not meet the specifications of DIN VDE 0107 or the corresponding local regulations.

If desired, we will provide the technical documentation for the product. However, this does not imply authorization to undertake repairs.

We cannot be held responsible for repairs made without our express written approval.

When any work is performed on the product, we would recommend that you obtain a certificate indicating the nature and scope of the work performed. The certificate should include any changes in rated parameters or operating ranges as well as the date, the name of the company and a signature.

### *Original accessories*

For safety reasons, only approved original accessories from Siemens or accessories from other manufacturers approved by Siemens AG, Medical Solutions Group, may be used with this product.

The operator is liable for any risks associated with the use of accessories not approved by Siemens.

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## *Combination with other products/components*

To ensure the required safety, only products/components expressly approved by SIEMENS AG, Medical Solutions Group, may be used in combination with this system.

Regarding the attachment of non-Siemens products to the image intensifier, please refer to  
(→ page 43)



*Additional components that are brought into the beam path (e.g. positioning aids) will attenuate radiation and degrade image quality.*

## *Attachment of dedicated options*

The attachment of certain (dedicated) options is permitted only if the following conditions are complied with:

### *General safety requirements*

The use of accessories that do not comply with the relevant safety requirements of this system can result in a reduced safety level of the combined system.

When choosing accessories, the following aspects must be considered in particular:

- ☐ Use of accessories close to the patient.
- ☐ Proof that the accessories have been safety tested according to the applicable IEC 60601-1 guideline and/or the IEC 60601-1-1 harmonized national standard.

### *Tilting resistance; mechanical strength; central ray migration*

To comply with the tilting resistance, mechanical strength and the central ray migration standards (IEC 60601-1, IEC 60601-2-32, UL60601-1, 4 times load, IEC 60601-1-3), the additional weight attached to the image intensifier must not exceed 4.5 kg (10 lbs).

If these conditions are not fulfilled, the function may be impaired.

### *Attachment*

When a dedicated option is used on the image intensifier, it must be ensured that there is no danger due to insufficient or incorrect attachment.

### *Attenuation equivalent*

According to IEC 60601-1-3, inadequate attenuation of the X-ray beam by materials between the patient and image receptor (here: I.I.) must be avoided.

Documented proof by the manufacturer is recommended.

Any auxiliary devices located in the beam path for calibration/adjustment of the dedicated options must be removed before operating the ARCADIS Avantic.



*Image quality can be impaired by placing materials directly in front of the image intensifier, or the applied dose is increased by the automatic adjustment. Additional objects in the beam path may result in increased scattered radiation.*

### *Weight counterbalance*



*Attachment of additional load on the image intensifier or tube assembly side means the loss of weight counterbalance and can lead to unwanted, unexpected or erratic movement of the C-arm.*

Users must be alerted to this by a warning label. The responsibility for affixing the corresponding warning label lies with the company that attaches the dedicated option to the C-arm.

### *Image quality*

The attachment of a dedicated option, such as a navigation system, must not affect image quality (impairment of the diagnosis).

After maintenance or service work, the correct function of the non-Siemens system on the image intensifier (e.g. 2D navigation) must be tested.



### *Electromagnetic compatibility*

EN 60601-1-2 must be observed in order to comply with the limit values for electromagnetic compatibility.

### *Additional safety information*

- ❑ Risk of injury due to sharp edges must be avoided.
- ❑ To avoid thermal overloading of components and short circuits, EN 60601-1 Section 7 and, if appropriate, UL 60601-1 must be complied with.
- ❑ Connecting external loads to the power supply of the C-arm system is not permitted.
- ❑ We recommend that users in the EU have the relevant manufacturer of the accessory operated by you confirm the CE Declaration of Conformity according to Appendix II, MDD and the Declaration of Compatibility according to Article 12, MDD. In countries outside the EU the relevant national regulations must be observed.



*Product liability and warranty are restricted or expire if the above listed conditions and limit values are not complied with when attaching equipment.*



*For non-Siemens options we generally accept no liability.*

### *Disposal*

There may be local regulations governing the disposal of your system:

- ❑ If you want to remove the product from service, take into consideration that there may be local regulations and laws governing its disposal. To ensure that these legal regulations are complied with and to avoid potential environmental hazards which may be caused by the disposal of your product, we recommend that you consult Siemens Customer Service.
- ❑ The disposal of batteries and packing material must be performed according to the national regulation in a non-polluting way.
- ❑ For further information about disposal of the equipment, please refer to the technical documentation.

# SIEMENS

## Operator Manual ARCADIS Avantic System Description

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

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## *Description of functions*

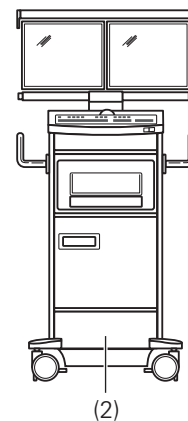
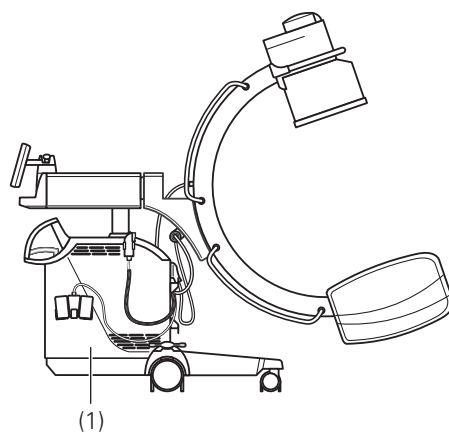
### *Use*

The ARCADIS Avantic is a mobile X-ray system designed for use in surgery, trauma centers, endoscopy and ambulatory patient care. ARCADIS Avantic offers the following operating modes for its wide application spectrum: Digital Radiography, Fluoroscopy, Pulsed Fluoroscopy as well as Subtraction / Roadmap and Digital Cine Mode (DCM) as an option.

The ARCADIS Avantic is especially suitable for use in cardiac/vascular surgery.

### *Equipment overview*

The ARCADIS Avantic consists of a C-arm system and a monitor trolley.



- (1) C-arm chassis with a 33 cm image intensifier and double-focus rotating anode tube with generator
- (2) Monitor trolley with keyboard, mouse, two TFT displays, CD R/W drive and memory for 40,000 images

### *Operating modes*

The ARCADIS Avantic has the following operating modes:

- ☐ Continuous Fluoroscopy (CFC)
- ☐ Pulsed fluoroscopy (PFC) with 8 f/s
- ☐ Digital Radiography (DR)

### *Options*

The following options are available for the ARCADIS Avantic:

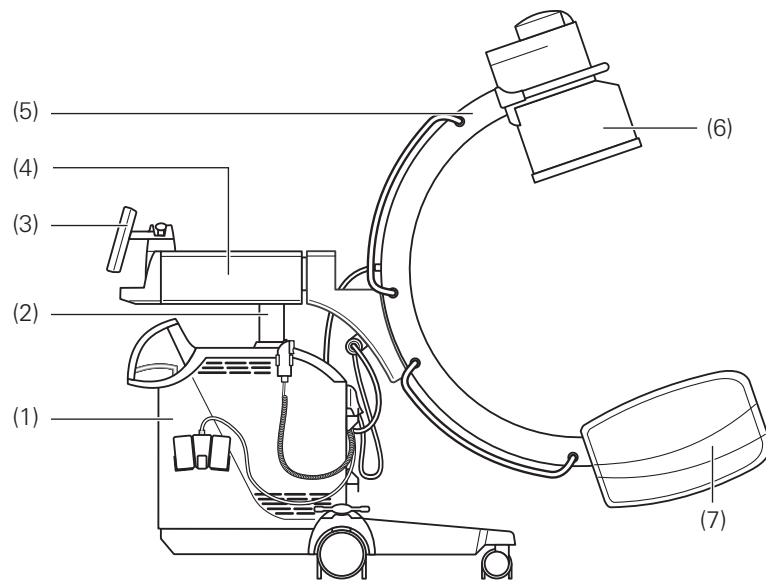
- ☐ additional operating modes Subtraction and Roadmap
- ☐ additional operating mode Digital Cine Mode (DCM) with up to 30 f/s
- ☐ Pulsed Fluoroscopy (PFC) 15 f/s
- ☐ Fluoro Loop
- ☐ 2 TFT High-contrast black/white displays (alternative to TFT color displays)
- ☐ Monitor Out Live
- ☐ Monitor Out Live & Reference
- ☐ DICOM Standard (Send/Receive, Storage Commitment, Print)
- ☐ DICOM Query/Retrieve (enhancement of DICOM Standard)
- ☐ DICOM Worklist (enhancement of DICOM Standard)
- ☐ DICOM MPPS (enhancement of DICOM standard)
- ☐ DICOM Advanced (Send/Receive, Storage Commitment, Print, Query/Retrieve, Worklist, MPPS)
- ☐ 2D measuring function (to measure angles and distances)
- ☐ HIPAA (Health Insurance Portability and Accountability Act)
- ☐ Local paper printer
- ☐ Local film printer
- ☐ Dose measuring chamber for dose area product/air kerma
- ☐ Integrated I.I. laser aimer
- ☐ Single-tank laser targeting device
- ☐ Multifunctional footswitch (with extended functionality)
- ☐ Grounding cable
- ☐ DHHS spacer



- ❑ Sterile covers for the image intensifier, X-ray tube assembly and C-arm
- ❑ Clamp

### *C-arm system*

The C-arm system comprises the following components:

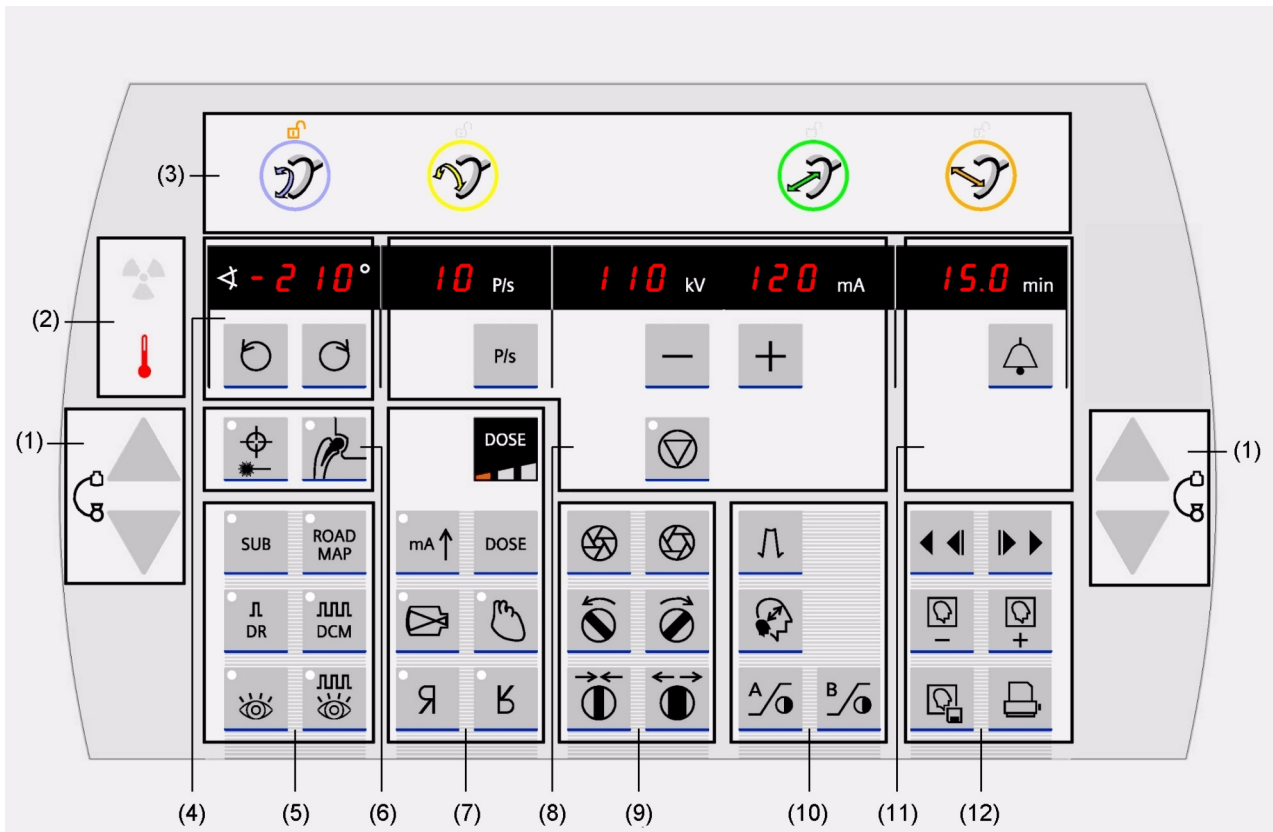


- (1) Electronics unit
- (2) Lifting column
- (3) Control and display panel (rotatable by  $\pm 135^\circ$ )
- (4) Horizontal support arm
- (5) C-arm
- (6) Image intensifier with integrated TV camera
- (7) Single tank with X-ray tube unit and integrated collimator

### *Control and display panel on the C-arm system*

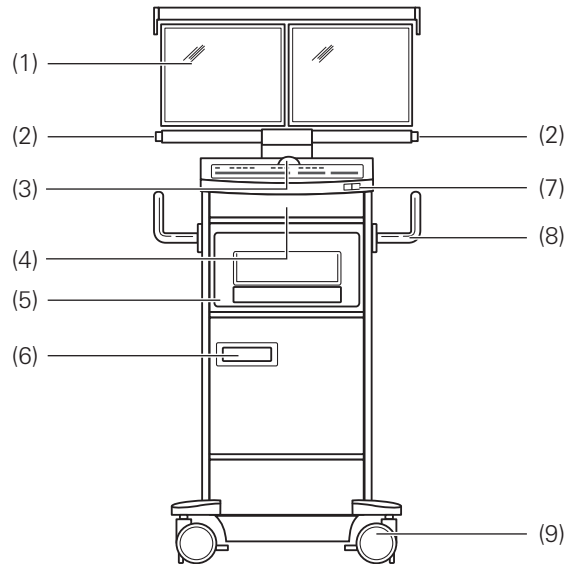
On the C-arm system you can find the control and display panel with membrane keys and digital displays for performing your examinations.

The individual keys and displays are grouped by their functions in different areas.



- (1) Vertical movement of the C-arm
- (2) Radiation indicator, X-ray tube assembly temperature
- (3) Releasing/locking the C-arm brakes
- (4) Image rotation
- (5) Selecting the operating mode
- (6) Laser light localizer On/Off, metal function On/Off
- (7) Selecting image parameters (high-contrast fluoroscopy, image quality, image display)
- (8) Selecting and displaying exposure parameters
- (9) Collimator setting
- (10) Image postprocessing
- (11) Radiation time
- (12) Image selection, storing and printing

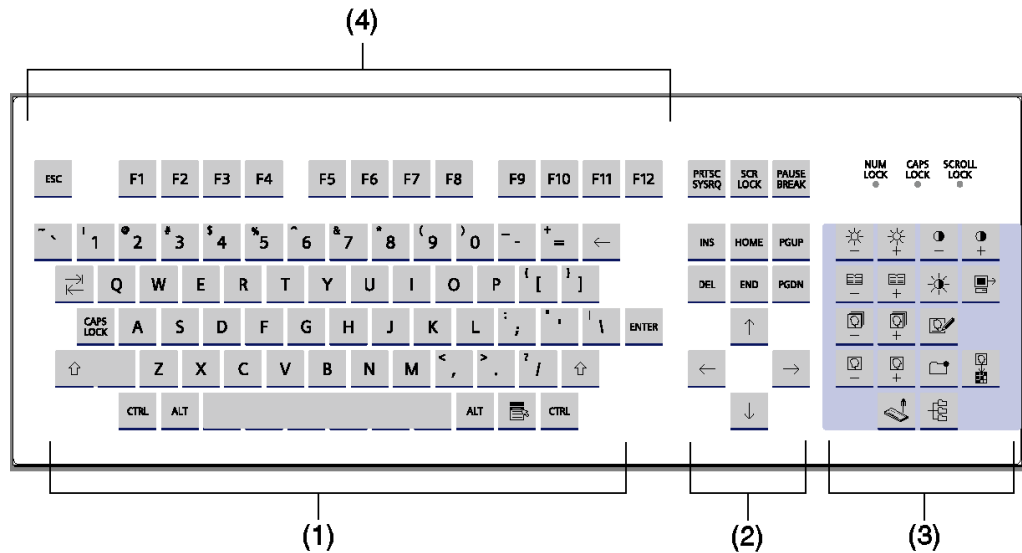
## *Monitor trolley*



- (1) Monitor A (left); Monitor B (right)
- (2) Radiation indicator
- (3) Keyboard and mouse
- (4) Compartment or space for options
- (5) Compartment or space for options (e.g. printer)
- (6) CD R/W drive
- (7) On/Off button of the ARCADIS Avantic
- (8) grab handles or push handles
- (9) front wheels with brakes  
back wheels with direction locks

### *Keyboard at the monitor trolley*

The application software for preparing (e.g. entering patient data) and evaluating examinations is operated by the keyboard at the monitor trolley.



- (1) Alphanumeric keyboard
- (2) Cursor keys
- (3) Symbol keypad
- (4) Function keys

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# Operation

## Starting operation

### Connecting the C-arm system with the monitor trolley

The C-arm system is connected to the monitor trolley with a cable.

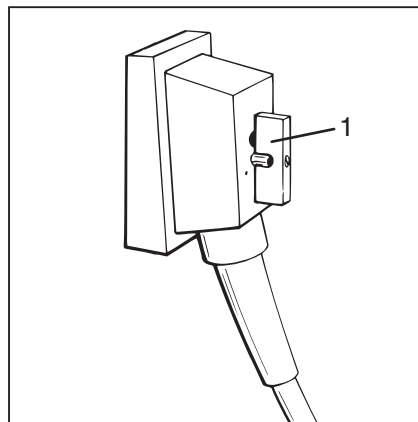


*The monitor trolley may only be connected to the corresponding C-arm system. If the monitor trolley is connected to the wrong C-arm system, an error message is displayed during system startup.*



*Before starting the ARCADIS Avantic, please make sure that the cables are straight (without loops).*

*Do not lay connection cables parallel to other cables.*



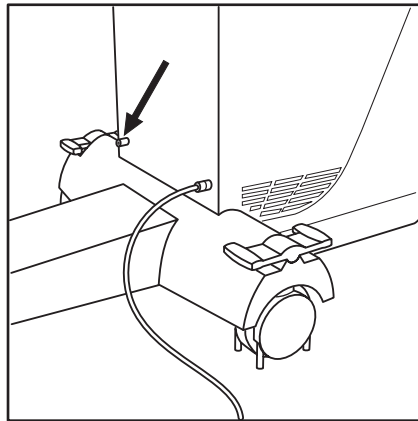
(1) Lever

- ◆ Turn the lever of the central plug all the way counterclockwise.
- ◆ Plug the central plug into the socket on the left side of the C-arm system.
- ◆ Turn the lever approx.  $\frac{3}{4}$  turns clockwise until it audibly locks into place and cannot be turned any further.
- The monitor trolley is connected to the C-arm system.

### *Establishing the equipotential bonding connection*

The ARCADIS Avantic can be connected to a protective earth terminal via the equal potential connector on the C-arm system. This will ensure that the ARCADIS Avantic has the same electrical potential as other units connected to the same protective earth terminal.

When performing cardiac examinations or examinations of the open skull, an additional grounding cable according to DIN 57107/VDE107 must be routed in rooms of Application Group 2.



- ◆ Clamp the grounding cable to the front face of the C-arm system (arrow) and to an equipotential bonding point in the patient vicinity.
- Equipotential bonding is established.

## Switchin the ARCADIS Avantic on

The ARCADIS Avantic is operated via a grounded wall socket.

- ◆ Plug the power plug into the appropriate socket.
  - The mains connection is established.



*The power cable is on the monitor trolley.*



- ◆ Press the **ON** button at the monitor trolley.
  - The ARCADIS Avantic is switched on.
  - The system automatically runs a self-test.



*Depending on the shutdown procedure used beforehand, the ARCADIS Avantic will be ready for operation again after 45 s (following a simple shutdown) or after 3 min (following a complete shutdown).  
(→ **page 37**)*

*The following functions are set:*

*Fluoroscopy mode (CFC)*

*Iris diaphragm in full format (edges visible)*

*Semi-transparent slot diaphragm in full format*



*Before beginning the examination, perform the daily function and safety checks.*

### *C-arm movements*

The C-arm can be adjusted in height by motor control.

The horizontal movement, swivel movement, angulation and orbital movement of the C-arm are performed manually. For this, you can use the C-arm handle, the I.I. handle or the handle on the single tank.

### *Operating the electromechanical brakes*

The ARCADIS Avantic is equipped with electromechanical brakes which you can control via the control panel of the C-arm system.

The buttons for releasing and locking the brakes for different directions of movement are marked with different colors. A graduation in the same colors for the corresponding directions of movement is located on the housing.

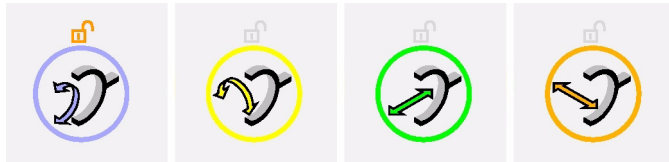
---

#### **WARNING**

As long as the brakes are not locked after movement, the C-arm system moves freely.

#### **Risk of injury to the patient and personnel!**

- ◆ Lock the brake once the C-arm is in the required position.
- 

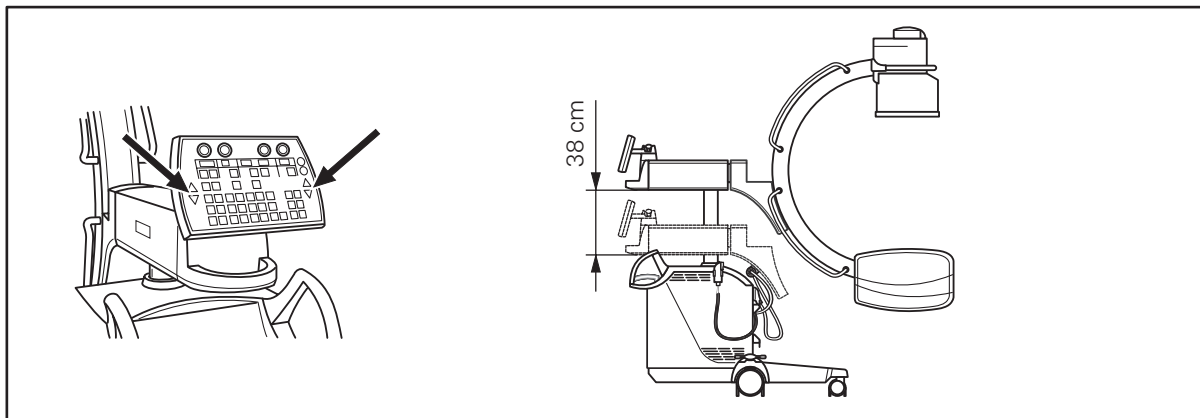


- ◆ Press the button for the brake for the desired direction of movement.
  - The “ brake released” display (open lock) lights up orange. The corresponding brake is released.
  - You can move the C-arm.
- ◆ Move the C-arm to the required position.
- ◆ Press the button for the brake again.
  - The “ brake released” display goes out. The corresponding brake is locked.
  - You can no longer move the C-arm in this direction.



### *Lifting and lowering the C-arm*

You can lift and lower the C-arm by motor control using the arrow keys on the control panel of the C-arm system.



---

### **WARNING**

Hazard caused by motorized movements.

#### **Movement of the lifting column may cause a crushing hazard!**

- ◆ Immediately press the red **EMERGENCY STOP** button on the electronics unit of the C-arm system.

---

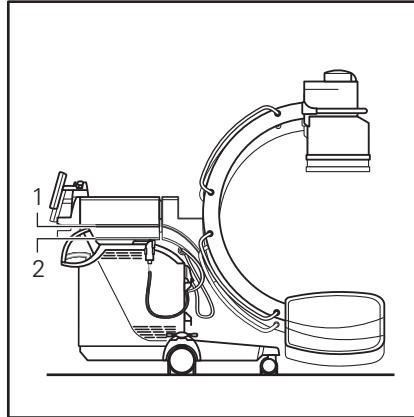
#### **Lifting the C-arm**



- ◆ Press the Up key on the control panel of the C-arm system.
  - The lifting column moves upwards.

## Lowering the C-arm

The lifting column can be lowered to position 1 and further down to position 2.



(1) Intermediate stop position when lowering the C-arm

(2) End position when lowering the C-arm



- ◆ Press the Down key on the control panel of the C-arm system.
  - The lifting column then moves to position 1 and automatically stops there.
  - A signal sounds.



- ◆ Press the Down key on the control panel of the C-arm system once more.
  - A signal sounds.
  - The lifting column is lowered further.

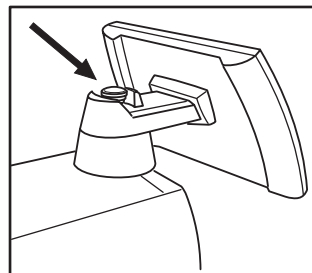


*For safety reasons, a signal sounds as the C-arm is lowered further.*



The lifting column cannot be moved.

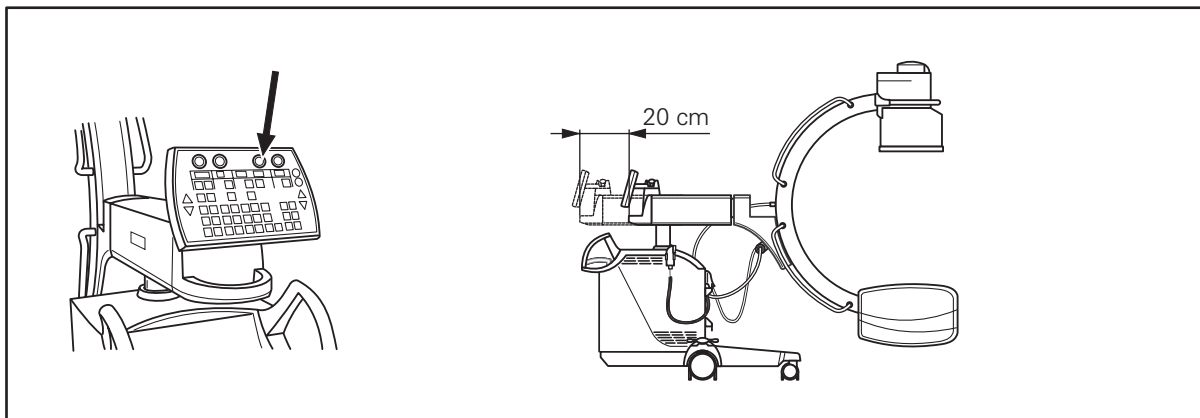
The **EMERGENCY STOP** button is pressed and must be unlocked.



- ◆ Turn the rotary knob clockwise.

## Moving the C-arm horizontally

You can move the support arm a maximum of 20 cm horizontally.



- ◆ Press the button marked in green for the *horizontal movement brake*.
  - The brake is released. The “brake released” display lights up orange.
- ◆ Move the support arm while observing the green scale.



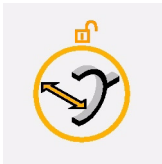
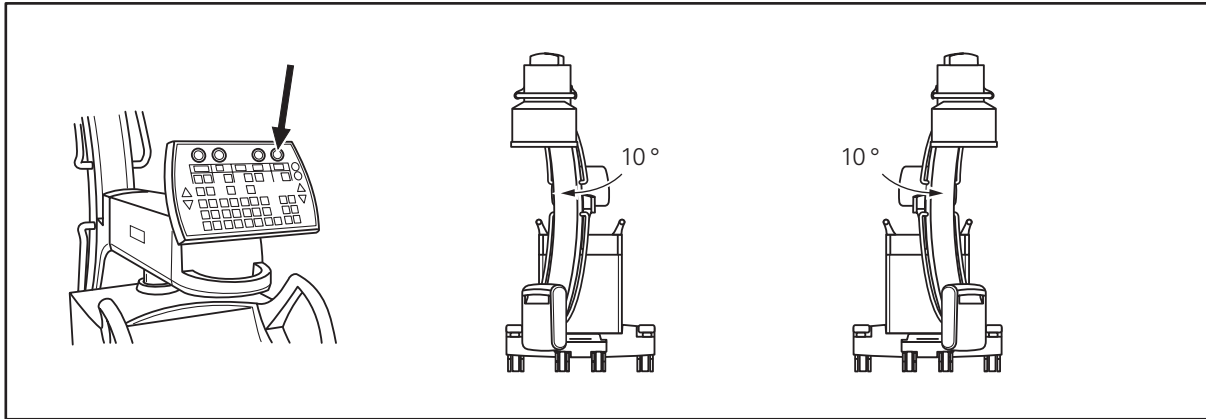
*If you want to move the support arm from the outer area (12–0) into the collision area (0–8), you will have to override a slight resistance at the 0 position (safety stop).*

*(→ Register 1: Safety, **page 41**)*

- ◆ Press the button for the brake again.
  - The brake is locked. The “brake released” display goes out.

### *Swivelling the C-arm*

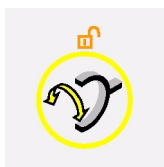
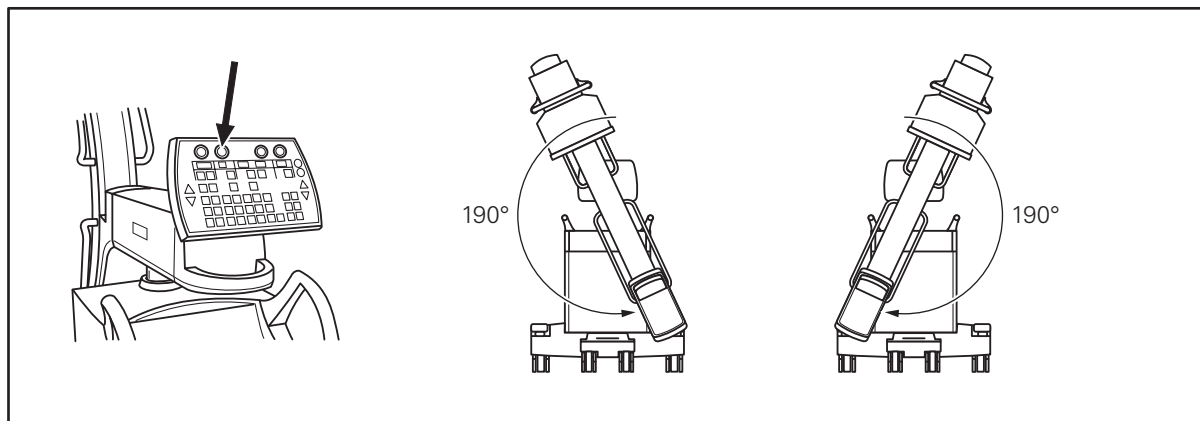
You can swivel the C-arm horizontally about the system column by about  $\pm 10^\circ$ .



- ◆ Press the button marked in orange for the *horizontal swivel* brake.
  - The brake is released. The "brake released" display lights up orange.
- ◆ Swivel the C-arm to the required position.
- ◆ Press the button for the brake again.
  - The brake is locked. The "brake released" display goes out.

## Angulating the C-arm

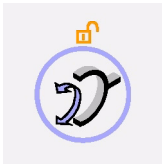
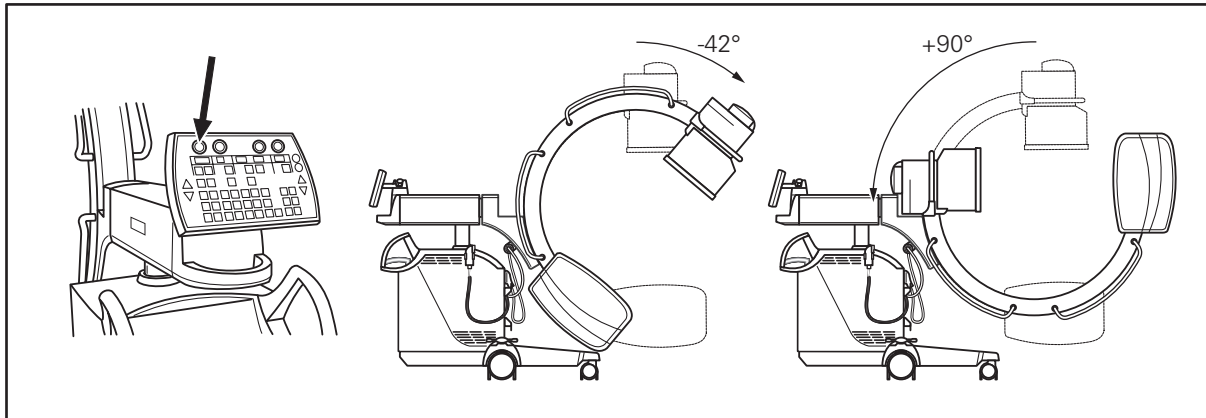
You can rotate the C-arm by  $\pm 190^\circ$ .



- ◆ Press the button marked in yellow for the *angulation* brake.
  - The brake is released. The “ brake released” display lights up orange.
- ◆ Rotate the C-arm to the required angulated position while observing the yellow scale on the support arm joint.
- ◆ Press the button for the brake again.
  - The brake is locked. The “ brake released” display goes out.

### *Orbital movement of the C-arm*

Starting from the basic position (0°), you can swivel the C-arm by up to +90° or up to -42° (132° in total).



- ◆ Press the button marked in blue for the *orbital movement* brake.
  - The brake is released. The “brake released” display lights up orange.
- ◆ Swivel the C-arm to the required orbital position while observing the blue scale.
- ◆ Press the button for the brake again.
  - The brake is locked. The “brake released” display goes out.

## *Preparing exposure*

### *Removing the I.I. grid (only pediatrics)*

By removing the I.I. grid, the radiation dose for a pediatric examination can be reduced.

#### **Removing the I.I. grid**

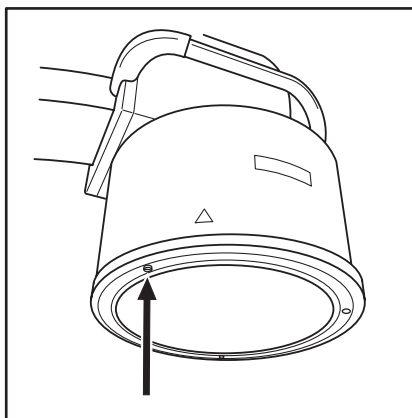
---

#### **CAUTION**

Falling down of the I.I. grid.

#### **Possible damage to the I.I. grid!**

- ◆ Hold on to the I.I. grid when loosening the mounting screw for dismounting.
- 



- ◆ Remove the mounting screw from the underside of the I.I. grid.
- ◆ Carefully pull the I.I. grid from its mounting.
- ◆ Put the I.I. grid down in a safe place.

### **Attaching the I.I. grid**

Once the pediatric examination is completed, you must re-attach the I.I. grid in order to ensure optimum image quality during standard examinations.

---

### **CAUTION**

Falling down of the I.I. grid.

#### **Possible damage to the I.I. grid!**

- ◆ Insert the I.I. grid carefully.
  - ◆ Tighten the screw and check it for tightness.
- 
- ◆ Mount the I.I. grid in the reverse order.
  - ◆ Tighten the screw and check that the grid has been attached firmly.

### *Positioning the C-arm*

- ◆ Align the ARCADIS Avantic.
- ◆ Release the brakes and set the C-arm to the required position.  
(→ page 12)



## *Collimator setting*

### **Setting the semi-transparent slot diaphragm**

The semi-transparent slot diaphragm is used primarily for collimation when imaging the extremities.

Collimation enhances image contrast and reduces scatter radiation. Direct radiation that passes the soft tissue laterally is reduced to such an extent, that differences in brightness do not disturb when images are viewed on the monitor.

By rotating the slot diaphragm, the collimated field can be quickly oriented to the direction of the anatomy under examination (e.g. the extremities).



- ◆ Press one of these keys.
  - The semi-transparent slot diaphragms are rotated to the left/right.



- ◆ Press this key.
  - The semi-transparent slot diaphragm is closed.



- ◆ Press this key.
  - The semi-transparent slot diaphragm is opened.

### Setting the iris diaphragm

The iris diaphragm is a collimator which serves to reduce radiation exposure to the patient and third parties. Smaller collimation produces less scatter radiation and therefore better image contrast. When the iris diaphragm is fully opened, it must be visible in at least 2 places in the fluoro image.



*The X iris leaves are set such that at least two leaves are visible.*

When the ARCADIS Avantic is switched on, the iris diaphragm automatically opens to full format.



- ◆ Press this key.
  - The iris diaphragm is closed.



- ◆ Press this key.
  - The iris diaphragm is opened.



*When you open/close the iris diaphragm or move the semi-transparent slot diaphragm without radiation, you can see the position of the collimator on the LIH image displayed with a line / circle superimposed.*

*When you release radiation, the diaphragms are in the position shown in the image.*

## *Image quality*

### **Selecting the dose rate level**



You can choose between three dose rate levels (differing from the current user program). The current dose level is displayed in the segment display on the control panel and on the imaging system.



- ◆ Press this key several times, if necessary.
  - The dose toggles between the low, medium and high levels.

### **Selecting the noise reduction factor**



- ◆ Press this key.
  - A low integration factor is selected (for recording fast-moving objects). When a low integration factor is selected, the LED lights up.
  - If the key is pressed again, the LED goes out. A higher integration factor is selected (for very slow movements).

### **Activating the metal function**

In case of metal in the measuring range (of the dominants) you can optimize contrast and brightness by activating the metal function.



- ◆ Press this key.
  - The LED lights up when this function is selected.

### *Image display*

#### **Selecting the image intensifier format**

You can select up to three zoom formats.



When this function is activated, the zoom format symbol is displayed in the **Examination** task card and the currently set zoom format is indicated (Values: MAG 1, MAG 2, MAG 3).



- ◆ Press this key several times, if necessary.
  - The image is displayed in different zoom formats.
  - The LED lights up when this function is selected.
  - The display of the zoom format in the **Examination** task card is activated.

#### **Setting image reversal**



- ◆ Press this key.
  - The image is flipped vertically.
  - The LED lights up when this function is selected.



- ◆ Press this key.
  - The image is flipped horizontally.
  - The LED lights up when this function is selected.



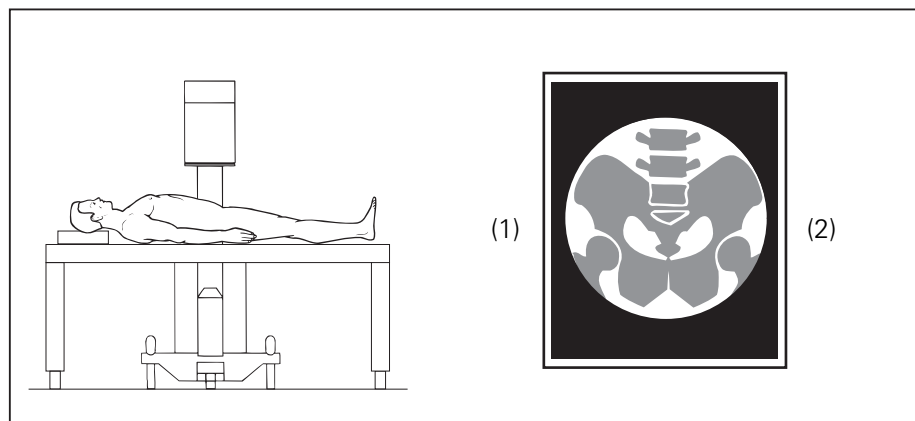
*The image reversal is effective only on the left (live) monitor.*

## Positioning an image for fluoroscopy

To have the image appear on the monitor in the desired orientation during fluoroscopy, you must rotate it.



*Object display on the monitor depends upon the C-arm system position relative to the patient.*



(1) right side of patient

(2) left side of patient



The rotation angle is displayed on the C-arm system ( $\pm 360^\circ$ ).

The rotation angle is displayed absolute (with respect to the original position) as well as relative (with respect to the previous image).



- ◆ Press one of these keys.
  - The image is rotated in the respective direction.

### *Operating mode*

You can select between up to six operating modes for the ARCADIS Avantic.

#### **Fluoroscopy**

For fluoroscopy (CFC) you can choose between several exam sets with different characteristic curves to determine exposure parameters for fluoroscopy. Every application allows to choose between different optimized programs. *Continuous Fluoroscopy* is the default setting after switching on the ARCADIS Avantic.

Exposure factors and system control units including the way in which the automatic setting is controlled:

- ❑ 1 K<sup>2</sup> matrix; 30 f/s frame rate; image integration (as a function of the K factor set), i.e. a number of K exposures are integrated into one image by sliding averaging; the K factor can be selected between K = 1 and K = 32 and can be assigned to an exam set and stored.

Typical clinical procedure:

- ❑ Fracture reposition of the distal upper extremity (e.g. distal forearm fracture) in the plaster room of an emergency outpatient clinic where, under continuous fluoroscopy, the fracture elements are reduced by extension, fixed temporarily in the best possible position and then fixed permanently by applying a plaster cast.

#### **Pulsed Fluoroscopy**

This operating mode (frame rates up to 15 f/s) allows a reduction in the radiation dose of up to 70% for the patient and operator. The pulse duration is generally 7 milliseconds. According to the level of noise reduction, many different fluoroscopic images can be integrated. For frame rates less than or equalling 2 frames per second, a type of intermittent continuous fluoroscopy is used where the pulse duration varies depending on the noise reduction set.

Exposure factors and system control units including the way in which the automatic setting is controlled:

- ❑ 1 K<sup>2</sup> matrix; frame rate usually 4 to 15 f/s; image integration (as a function of the K factor set), i.e. a number of K exposures are integrated into one image by sliding averaging; the K factor can be selected between K = 1 and K = 8 and can be assigned to an exam set and stored.

Typical clinical procedure:

- ❑ Fracture reposition of the distal upper extremity (e.g. distal forearm fracture) in the plaster room of an emergency outpatient clinic where, under continuous fluoroscopy, the fracture elements are reduced by extension, fixed temporarily in the best possible position and then fixed permanently by applying a plaster cast, with the additional advantage of dose savings for the patient and medical staff.

### **Digital Radiography**

Digital radiography (DR) provides an electronic instant image of the patient on the monitor. DR is recommended for final exposures. The exposure time depends on the noise reduction set.

Exposure factors and system control units including the way in which the automatic setting is controlled:

- ❑ 1 K<sup>2</sup> matrix; with image integration, depending on the setting; X-ray pulse with 7 ms up to approx. 1400 ms width, depending on the noise reduction set.

Typical clinical procedure:

- ❑ Final follow-up exposure of a fracture reposition of the distal upper extremity (see above).

### **Digital Cine Mode (option)**

Due to its high frame rate (0.5–30 frames/s) and equally high performance, Digital Cine Mode (DCM) can be used for the display of moving objects (e.g. heart).

### **Subtraction / Roadmap (option)**

The subtraction memory option allows you to perform a digital subtraction angiography and simultaneously display the unsubtracted angiogram on the second monitor. Subtraction technique allows hemodynamic display as well as display of the maximum vascular filling and Roadmap. The Roadmapping features can also be used for other interventional procedures.

Exposure factors and system control units including the way in which the automatic setting is controlled:

- ❑ 1 K<sup>2</sup> matrix; continuous fluoroscopy; storage rate usually 3 to 8 f/s; image integration (as a function of the K factor set), i.e. number of K exposures are integrated into one image; the K factor can be set between K = 1 and K = 32 by an authorized technician.

Typical clinical procedure:

- ❑ Display of an arterial vessel for localizing vascular stenoses with injection of a contrast medium to enable the contrast-enhanced display of the vascular filling (subtraction of the native image (mask) from the contrast-enhanced image).
- ❑ Alternative to native image display, subsequent inversion of the displayed image allows you to display a catheter introduced into the vessel path using the Roadmap function.



*For information on performing an examination with Subtraction or Roadmap refer to*

*(→ Register 4: Examination, page 17)*

## Selecting an operating mode

The operating modes can be selected directly at the control panel of the C-arm system or in the **Examination** task card.

The operating modes can also be selected via the corresponding button on the optional multifunctional footswitch, if used.

(→ Register 10: Accessories and Options, page 5)



*When an operating mode is selected, the LED of the corresponding key lights up on the control panel. On the imaging system the operating mode is indicated by a symbol or text display. The current operating mode is deselected when switching to another mode.*



*By repeatedly pressing an operating mode key that is already activated, you can scroll through the exam sets assigned to the corresponding operating mode. This is only possible if a patient has already been registered.*



## Continuous Fluoroscopy (CFC)



- ◆ Press this key.
- *Fluoroscopy* mode is selected.
- The LED lights up.



*When the ARCADIS Avantic is switched on, it automatically defaults to **Fluoroscopy** mode.*

## Pulsed fluoroscopy (PFC)



- ◆ Press this key.
- The *Pulsed Fluoroscopy* mode is selected.
- The LED lights up.

## Digital Radiography (DR)

Digital radiography (DR) provides an electronic instant image with best image quality. DR is recommended for final exposures.

On activation of digital radiography a short radiation pulse is released.



- ◆ Press this key.
- *Digital Radiography* mode is selected.
- The LED lights up.



*In order to ensure sufficient image quality, images are completely acquired after start of acquisition, even if no more radiation is released. The effective acquisition time depends on the preset integration factor and is a maximum of 1.8 seconds.*

*After complete image acquisition, radiation is automatically switched off, even if the radiation release button remains pressed.*

## Digital Cine Mode (DCM)



- ◆ Press this key.
- *Digital Cine Mode* is selected.
- The LED lights up.



*The maximum radiation time is 10 seconds up to 25 seconds (depending on the mains voltage and the rating of the internal line resistance).*

### High-contrast fluoroscopy (Power Mode)

For high-contrast fluoroscopy you can switch from the normal characteristic to the "high contrast" characteristic. This characteristic temporarily enables maximum output. The maximum radiation time with "high contrast" is 15 s.

At the end of this maximum radiation time, radiation is automatically switched off. In the CFC mode, the "high contrast" function is automatically deselected at the end of radiation. During the exposure an acoustic warning signal is emitted. If the ARCADIS Avantic is connected to an insufficient mains supply (e.g. high internal resistance), the maximum radiation time is automatically reduced in the CFC and DCM modes.



*In the DR and DCM modes, "high contrast" is selected by default (LED lights up) and cannot be deselected.*

*"High contrast" is not possible in the PFC, SUB and Roadmap modes.*



- ◆ Press this key.
  - *High contrast* is selected.
  - The LED lights up.
- ◆ Press this key again to switch it off.
  - *High contrast* is deselected.



*If the X-ray tube overheats, high-contrast fluoroscopy cannot be selected; the overload protection will change the characteristic curve.*

*(→ Register 1: Safety)*

*If you select another operating mode or change the exam set, the selection of SIREMATIC curves will change. This depends on the corresponding setting of exam sets.*

### Subtraction (SUB)

The subtraction technique enables the isolated display of the vascular system after contrast injection by means of background subtraction.

(→ Register 4: Examination, **page 17**)



- ◆ Press this key.
  - *Subtraction* mode is selected.
  - The LED lights up.

### Roadmap

The Roadmap technique allows the user to accurately place a catheter into a blood vessel under fluoroscopy.

(→ Register 4: Examination, **page 17**)



- ◆ Press this key.
  - *Roadmap* mode is selected.
  - The LED lights up.

### *Setting the X-ray parameters manually*

The default X-ray parameters can be changed manually with the +/- keys for kV/mA and the pulse rate key.

#### **Automatic dose rate control**

Using automatic dose rate control (ADR), the mean value of the image gray values is held constant within the dominant largely independently of the object transparency. This ensures optimal image quality for on-screen evaluation. The dominant position is centered to the image intensifier input.  
(→ Register 8: Technical Description, **page 6**)

There are three factory default settings for the dose rate: reduced dose, standard dose, increased dose.

#### **Activating ADR stop**

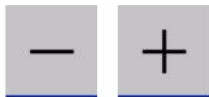
When metallic objects (e.g. intermedullary nails) are introduced into the beam path or when examining objects of varying density (e.g. hip prosthesis) under fluoroscopy, it is recommended that you set the adjusted kV value with the **Dose rate control Stop** key at the start of fluoroscopy.



- ◆ Press this key.
- The stop function is switched on, the LED lights up.
- The automatic dose control is disabled.
- The +/- keys for kV/mA are enabled.

### Setting the X-ray parameters manually

You can set the kV/mA values manually by activating the **Dose rate control Stop** key.



- ◆ Press the +/- keys briefly.
  - The kV/mA values are increased/reduced.

or

- ◆ Keep the +/- keys pressed for a period of time.
  - This results in a continuous increase/decrease of the particular X-ray parameters.

–

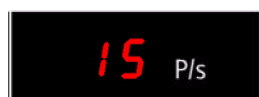


- The set kV value and the resulting mA value are shown on the display.
- Once the upper or lower limit of the setting range is reached, an acoustic signal is emitted every time you press the key again.



*The mA values assigned to the kV values result from the SIREMATIC curves.  
(→ Register 8: Technical Description, page 6)*

### Setting pulses per second

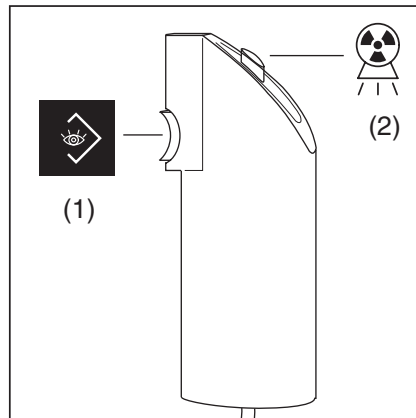


- ◆ Press this key several times, if necessary.
  - The pulse rate is changed.

### *Radiation release*

#### *Using the hand switch*

The hand switch is used to remote control radiation release and image storage. The hand switch can be connected on either side of the C-arm system.



(1) Button for saving images

(2) Release switch

#### **Releasing radiation**



- ◆ Use the button to release the exposure.
  - Radiation is released in the selected operation mode.
  - The current radiation parameters are displayed on the control panel of the C-arm system.

–



## Confirming a warning signal

When the fluoroscopic time exceeds 5 minutes, an audible alarm sounds (depending on country-specific configuration).



- ◆ Press the **reset key** on the control panel of the C-arm system.
  - The acoustic warning signal is deactivated.



*5 Minutes after reset, the alarm signal sounds again.*

*10 Minutes after the last reset, radiation is automatically disabled.*

## Storing images (during radiation)



- ◆ Press this button on the hand switch during radiation.
  - The image currently generated and displayed is saved in the local database.

(→ Register 4: Examination, **page 27**)

## Storing images (after radiation)



- ◆ Press this key on the hand switch.
  - The last acquired image is stored.



*The ARCADIS Avantic transfers images from monitor A to monitor B and then stores them in the local database.*



*Images can also be stored via the corresponding button on the optional multi-functional footswitch, if used.*

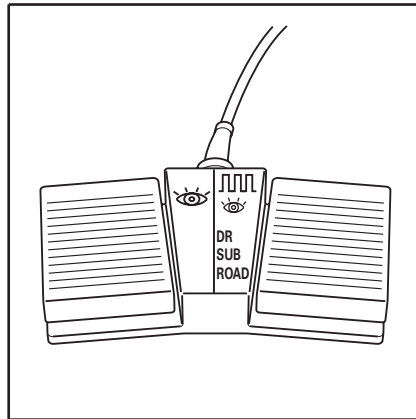
(→ Register 10: Accessories and Options, **page 5**)

### *Using the footswitch*

The footswitch is used if both hands need to be free during the exposure.



*For operation of the multifunctional footswitch (option) see  
(→ Register 10: Accessories and Options, **page 5**)*



Standard footswitch

---

### **WARNING**

When the C-arm is rotated by 180° and lowered to maximum, the image intensifier could touch the footswitch.

#### **Unintentional release of radiation!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.

#### **Releasing radiation**

The left pedal is always used to activate fluoroscopy (CFC) (standard setting).

The right pedal is used to activate the currently selected operating mode. *Exception:* If fluoroscopy (CFC) is selected, the right pedal is assigned the digital radiography (DR) mode.



*The functionality of the pedals can optionally be changed.*

- ◆ Keep the foot pedal pressed during radiation release.



## Switch off

Before disconnecting the ARCADIS Avantic from the mains, you must shut it down.

During the shutdown procedure the imaging system is powered down. There are two different procedures, each having a different reset time.

### ❑ Simple shutdown

The imaging system goes into "Hibernate" mode before it switches off.

When the ARCADIS Avantic is switched on again, it will be ready for operation after only approx. 45 s.

Simple shutdown can be performed up to 12 times in a row. After that, a complete shutdown is performed automatically. After you have performed the simple shutdown procedure 10 times in a row, a message is displayed before the system is shut down completely.

### ❑ Complete shutdown

The imaging system is shut down completely before it switches off. When the ARCADIS Avantic is switched on again, it will be ready for operation after approx. 3 min.

For technical reasons a complete shutdown must be performed on a regular basis. Unless initiated by you, a complete shutdown is performed automatically when the system is shut down for the 13th time.



*If you want to ensure a very short power-up time of your ARCADIS Avantic system, we recommend that you initiate a (complete) shutdown yourself before the maximum number of 12 (simple) shutdown procedures is reached. You can do this during a break between examinations, for example, and then switch the ARCADIS Avantic on again in time before the next examination.*

## Switching the system off

- ◆ Close the current examination by selecting **Patient > End Examination** in the main menu of the **Examination** task card.
- ◆ Make sure there is no CD in the drive.



*If there is a CD in the drive when you restart the ARCADIS Avantic, the system will not recognize the CD drive. In this case you would have to remove the CD, switch the system off and then restart it.*

### Simple shutdown



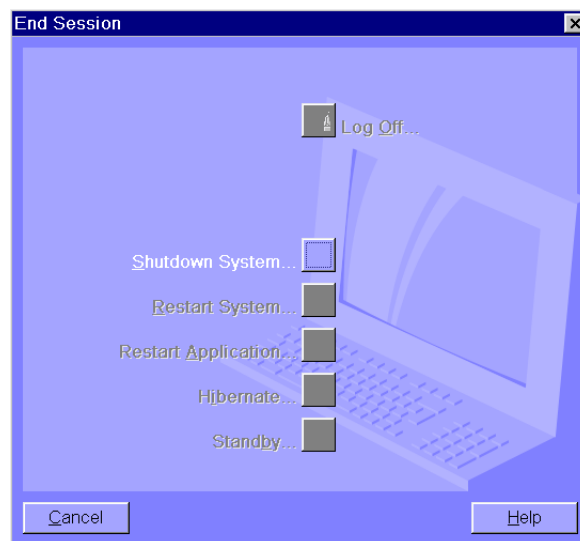
- ◆ Press the **OFF** button at the monitor trolley.
  - The C-arm system is immediately switched off.
  - The imaging system and monitor A switch off after the computer has been shut down.



*The system can be restarted as early as 5 seconds after pressing the OFF button (even during shutdown).*

### Complete shutdown

- ◆ Select **Options > End Session** in the main menu at the monitor trolley.
  - The **End Session** dialog box opens.



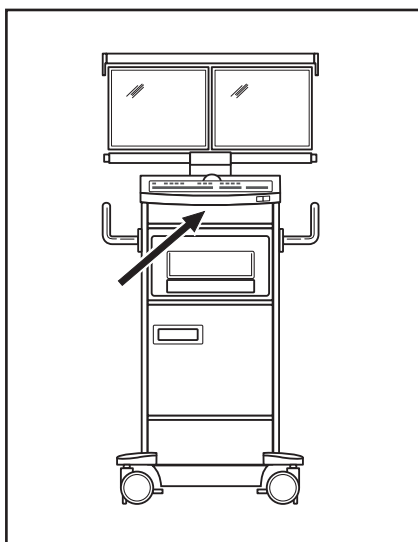
- ◆ Click **Shutdown System**.
  - The imaging system is completely shut down.



- ◆ Press the **OFF** button at the monitor trolley.
  - The C-arm system, the imaging system and the monitors are switched off.

### *Reactivating the system*

If the imaging system cannot be shut down properly after pressing the OFF button and does not react any more, you must deactivate the ARCADIS Avantic as follows:



- ◆ Press the reset button at the bottom of the key panel at the monitor trolley.
  - All running processes are aborted and the ARCADIS Avantic is shut down.
- ◆ Switch the ARCADIS Avantic on again and let it boot up completely.
  - Now you can either continue using the ARCADIS Avantic or shut it down.



*If the ARCADIS Avantic is not fully operational in spite of resetting it, please notify Customer Service.*

### *Transport*

The C-arm system is equipped with 4 wheels for easy steering in any direction. The C-arm system can be locked in place with the foot brake.

---

#### **CAUTION**

When transporting the C-arm system as well as the monitor trolley, the incline of the ramp or floor must not exceed  $\pm 10^\circ$ .

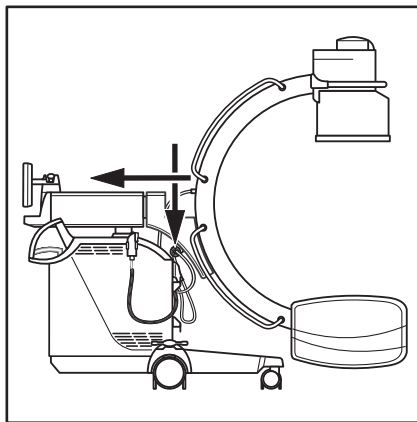
#### **The C-arm system can tip over!**

- ◆ Avoid an inclination of more than  $\pm 10^\circ$ .
- 

### *Transport and parking position of the C-arm system*

Prior to transport, the C-arm system must be set to the transport position.

#### **Prior to transport**



- ◆ Release all brakes on the C-arm.
- ◆ Set the C-arm to the transport position shown in the drawing.
- ◆ Lower the lifting column down to position 2.  
(→ page 13)
- ◆ Move the horizontal carriage all the way back if possible.
- ◆ Lock all brakes on the C-arm.
  - None of the "brake released" displays must light up.

### Disconnect the power supply plug.

- ◆ Switch off the ARCADIS Avantic and wait for it to shut down.
- ◆ Pull the power plug out of the wall outlet.



*Pull on the plug, not on the cable!*

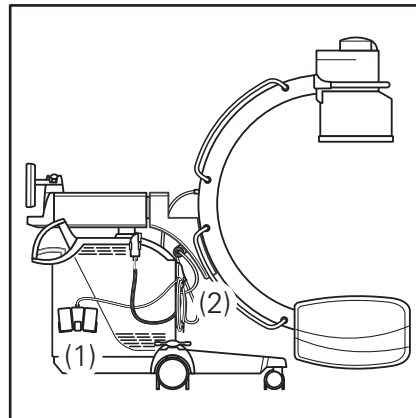
*The ARCADIS Avantic can be switched on again after approx. 5 s!*

*Please note that after finishing an examination, the ARCADIS Avantic must be shut down properly before it is disconnected from the power supply.*

### Disconnect the supply plug

- ◆ Turn the lever  $\frac{3}{4}$  counterclockwise and remove the plug.
  - The connection of the central plug to the monitor trolley is shut-off.
- ◆ If attached, disconnect the grounding cable from the C-arm system.

### Rolling up the footswitch cable



(1) Footswitch holder

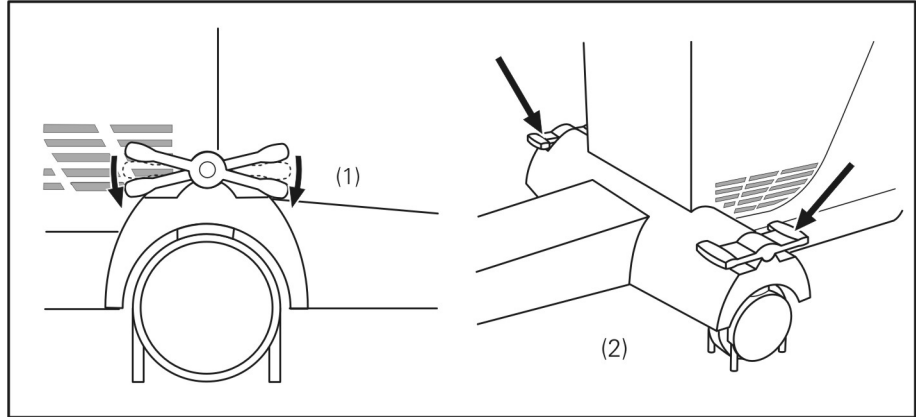
(2) Footswitch cable holder

- ◆ Roll up the footswitch cable and place it on the holder and place the footswitch into its holder.



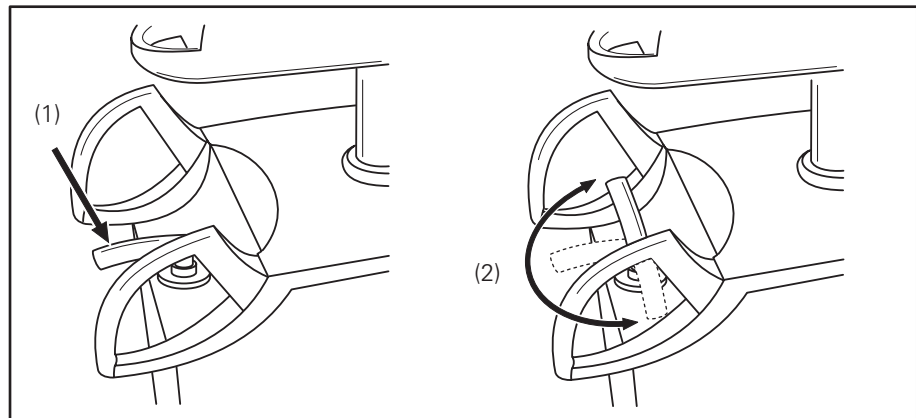
*When placing the footswitch in the holder, please be careful not to kink the cable.*

### Driving the unit



- (1) Locking the foot brake (pedal tilted)
- (2) Releasing the foot brake (pedal horizontal)

◆ Release the foot brake.



- (1) Steering lever shown in the position for forward travel.
- (2) The steering lever can be locked into position for transverse travel to the right or left

◆ Lift the steering lever and turn it in the desired direction.



*The steering lever can be locked into three different positions. One is for movement straight ahead, the others for transverse travel to the right or left.*

- ◆ Move the C-arm system by hand.
  - If the steering lever is in a transverse position, the C-arm system moves parallel to the lever position.



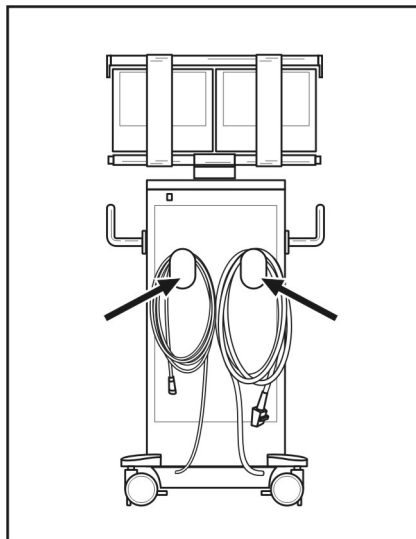
*When transporting the C-arm system make sure there are no obstructions on the floor.*

### *Monitor trolley transport position*

During transport, the rolled-up power cable and the connection cable for the C-arm system should be placed on the cable holders on the back of the monitor trolley.

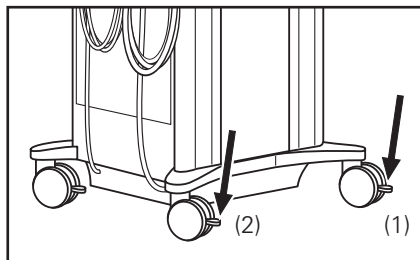


*Do not use the handles to deposit the wound up cable.*



- ◆ Place the rolled-up cables on the transport holders.

### Driving the unit



- ◆ Release the brakes (blue footswitches) on the front wheels (see arrow (1)).
- ◆ Use the directional locks on the back wheels for long straight distances (see arrow (2)).



# SIEMENS

## Operator Manual ARCADIS Avantic Patient Data

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

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## *Introduction to patient registration*

Before you can examine a patient with your system, you must register the patient.

Registration means that you give your system all the information about a patient that it requires for an examination.

Depending on how registrations are organized in your hospital and how much time you have for registration, you can choose between different patient registration procedures.

### **Emergency registration**

If a patient is admitted who is in an extremely critical condition and must therefore be examined and treated immediately, call up emergency registration. This reduces the time before you can begin the examination to a minimum.

### **Registration for the examination**

However, if you want to register a patient for an examination, then you first enter the patient's data or call it up from the database and then examine the patient.

### **Preregistration**

If you want to prepare the system to examine a patient at a later time, then you can preregister the patient.

For example, in the morning you can enter the data of all the patients to be examined during the day. When you want to begin an examination, simply call up the relevant data and edit them, if necessary. This saves time during the examination.

### **HIS/RIS query**

If your system is connected to a HIS/RIS system (hospital and radiology information system), you can query and retrieve data for the patient to be examined for preregistration or registration.

### *The Patient Registration window*

The **Patient Registration** window is subdivided into four areas into which you can enter topically coherent data.

The screenshot shows the 'Patient Registration' window with a blue title bar and a close button. The window is divided into four main sections, each with a vertical label on the left: 'PATIENT', 'HOSPITAL', 'PROCEDURE', and 'INSTITUTION'.  
(1) **PATIENT** section: Includes fields for Last name, First name, Middle name, Title, Suffix, Other Patient Name(s), Other Patient ID(s), Patient ID, Date of Birth, Sex (radio buttons for Male, Female, Other), Age (text field and Years dropdown), Height [nn'mm"], Weight [lb], and Additional info (text area). A 'Details...' button is at the bottom.  
(2) **HOSPITAL** section: Includes dropdown menus for Referring physician, Requesting physician, Admitting diagnosis, and Ward, and a text field for Admission ID.  
(3) **PROCEDURE** section: Includes text fields for Accession No, Request ID, and Requested procedure(s), a Study list (text area), a 'Delete' button, a Study dropdown, and a Study comment (text area).  
(4) **INSTITUTION** section: Includes a dropdown for Institution name, and two sets of dropdowns for '1. Performing physician' and '2. Performing physician', '1. Operator', and '2. Operator'.  
At the bottom of the window are buttons for 'Preregister', 'Exam', 'Search', 'Cancel', 'Emergency', and 'Help'.

- (1) Personal data of the patient (PATIENT)
- (2) Hospital-specific data (HOSPITAL)
- (3) Study-specific data (PROCEDURE)
- (4) Institution data (INSTITUTION)



*The input fields can be adapted by Siemens Service.*

---

## Emergency registration

An emergency registration is performed if a patient must be examined and treated immediately, without wasting time entering the patient's data.

You can register an emergency patient either in the **Emergency Registration** window or in the **Patient Registration** window.



*If you release radiation without having registered a patient for the examination, a corresponding dialog box is displayed. After radiation has been released again, an emergency patient is automatically registered. You can register an emergency patient by releasing radiation twice with the hand switch or footswitch. Thus entries at the monitor trolley are unnecessary.*

### **Provisional patient data**

The patient is registered with provisional data as an emergency patient. As soon as you have more time after the examination, you must complete the patient and examination data of your emergency patient using the **Patient Browser**.

### *Emergency Registration window*



- ◆ First finish off or interrupt the current examination.
- ◆ Press the button in the tool bar of the **Patient Browser**.
- or —
- ◆ Select **Patient > Emergency** in the main menu.
  - The **Emergency Registration** window is opened.

**Emergency Registration**

**PATIENT**

Last name: 00.12.18-09:56:44-STD  
First name:   
Middle name:   
Title:  Suffix:   
Other Patient Name(s):   
Other Patient ID(s):   
Patient ID: 00.12.18-09:56:44-STD-1.3.12.2.11  
Date of Birth: 11/18/1858  
Sex: ☐ Male ☐ Female ☒ Other  
Age: 142 Years   
Height [ft]:   
Weight [lb]:   
Additional info:   
Details...

**PROCEDURE**

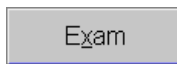
Accession No:   
Request ID:   
Requested procedure(s):   
Requested procedure(s):   
Delete  
Study:   
Study comment:

**INSTITUTION**

Institution name:   
1. Performing physician:   
2. Performing physician:   
1. Operator:   
2. Operator:

Exam Cancel Help



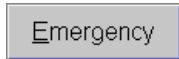


- ◆ Click the **Exam** button in the **Emergency Registration** window.
  - The **Emergency Registration** window is closed.
  - The **Examination** task card is opened.



*By clicking Cancel you can stop emergency registration at any time, e.g. if you have accidentally called up the Emergency Registration window instead of the Patient Registration window.*

## *Emergency registration in the Patient Registration window*



- ◆ First finish off or interrupt the current examination.
- ◆ Press the key on the symbol keypad.
  - The **Patient Registration** window is displayed.
- ◆ Click the **Emergency** button in the **Patient Registration** window.
  - The **Patient Registration** window is closed.
  - The **Examination** task card is opened.

---

## Registering a new patient

If a patient has never been examined in your hospital or practice before, no data about this patient will be stored on your system.

Therefore all the data of this patient must be entered before an examination.

### Registration

If you register a patient and want to examine this patient immediately afterwards, enter all the examination-relevant data into the corresponding input fields.

### Preregistration

If you only want to preregister the patient for later examination, you must fill in at least the mandatory input fields. These are emphasized by bold letters (sex, name, patient ID and date of birth).

## Calling up the Patient Registration window

The data of a new patient are entered into the empty **Patient Registration** window.

You can call up the Patient Registration window from the **Patient** menu, via icon buttons on the **Viewing** task card and from the **Patient Browser**.



- ◆ Press the key on the symbol keypad.

or



- ◆ Click the corresponding button on the **Viewing** task card / **Patient** subtask card or in the tool bar of the **Patient Browser**.

or

- ◆ Select **Patient > Register**.

– The **Patient Registration** window opens.



*If you call up the Patient Registration window from the **Patient Browser**, make sure that you have not selected a patient or study there. Otherwise the selected data are transferred to the **Patient Registration** window.*

### *Entering data*

After you have called up the Patient Registration window, the cursor is in the input field for the patient name in the **PATIENT** area.

The **Exam** and **Preregister** buttons remain deactivated until you have entered all the information required to register or preregister a patient.

### *Personal data*

Name, patient ID, age, and sex of the patient are mandatory entries. This information uniquely identifies the patient in your databases.



*If you do not enter a **Patient ID**, your system automatically generates an identification code from the date, time, abbreviation for daylight-saving or standard time, and the identification number of your system (unique worldwide).*

---

### **CAUTION**

For internal identification of patient data, e.g., studies, series and images, the system time is used. By resetting the system time, duplicate identifiers may be created.

#### **Data may be assigned to the wrong patient!**

- ◆ If it is necessary to reset the system time for synchronization, wait until the new system time is later than before.

- 
- ◆ Enter the personal data of the patient (at least the mandatory input fields) in the **PATIENT** area.



*The valid input format for the **Date of Birth** is displayed in the status line. Enter the year of birth using four digits.*



*If you do not know the date of birth you can enter the estimated **Age**. The system then calculates a date of birth from the current date. In the selection field next to it you can specify whether the age is in years, months or days (for example for infants).*

### *Hospital-specific data*

In the **HOSPITAL** area, you can enter the referring physician, the preliminary diagnosis, and the hospital ward where the patient is located.

- ◆ Enter the hospital-specific data via the keyboard.

or

- ◆ Select the entries you require from the selection lists.

### *Examination data*

In the **PROCEDURE** area, data from the HIS/RIS system (option), if connected, are entered automatically.

- ◆ Do not enter any data here.



*After you have registered the patient, the data for the upcoming examination can be entered in the **Examination** task card.*

### *Institution data*

In the **INSTITUTION** area, you enter the information about the examining institution and the examination personnel. This information can be helpful if the examination results are passed on to a different organization for reporting.

- ◆ Enter the institution data via the keyboard.

or

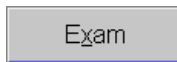
- ◆ Select the entries you require from the selection lists.

### *Completing data entry*

After you have entered all the necessary patient data in the **Patient Registration** window, you can register the patient for the ensuing examination or preregister him or her for examination later on.

### *Registering a patient for examination*

If you want to examine the patient directly afterwards, register the patient now. The ensuing examination is conducted with the data that you have entered.

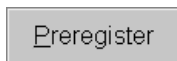


- ◆ Click the **Exam** button.
- The **Examination** task card is displayed.
- Now you can start examining the patient.

### *Preregistering a patient*

You can preregister the patient with the data entered if you want to perform the examination later on. You can then access the patient data again when you start the examination.

(→ **page 13**)



- ◆ Click the **Preregister** button.
- The patient is included in the scheduler. The input fields of the **PATIENT** area in the **Patient Registration** window are empty again. You can enter the data of the next patient.

---

## Registering a known patient

A patient who is preregistered or has already been examined in your hospital or practice is known to your system.

You can search for the patient in the databases and transfer the information stored into the **Patient Registration** window.

### **Resuming a commenced study (e.g. IVP)**

Adopt the examination data of a patient additionally to the personal data, if you want to resume the patient's study. You can then resume the study.

### **HIS/RIS query**

If the patient's data have already been entered via a HIS/RIS system, you can query and retrieve the data from the hospital network and transfer them to the scheduler. The patient is then preregistered.



*The scheduler is updated via the HIS/RIS system at regular intervals. If the patient registered for examination does not appear in the scheduler, although he/she has been entered via the HIS/RIS, update the scheduler manually by double-clicking the scheduler icon. This is advisable in particular after switching on or restarting the ARCADIS Avantic.*

### *Searching in the Patient Registration window*

You can search for patient data in the databases from the **Patient Registration** window and then use the data for registration.



*In **Registration Configuration** you can define which databases (e.g. local database, local archive) are to be searched.*

*(→ page 22)*

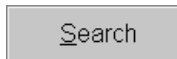
### *Starting a search*

- ◆ Call up the empty **Patient Registration** window.
- ◆ Enter the data known to you in the **Last name** and **Patient ID** fields.



*If you know only part of the name or part of the ID of the patient you are looking for, you can use the asterisk "\*" as a wildcard.*

*It does not matter whether your entries contain upper or lower case letters.*



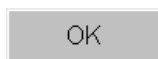
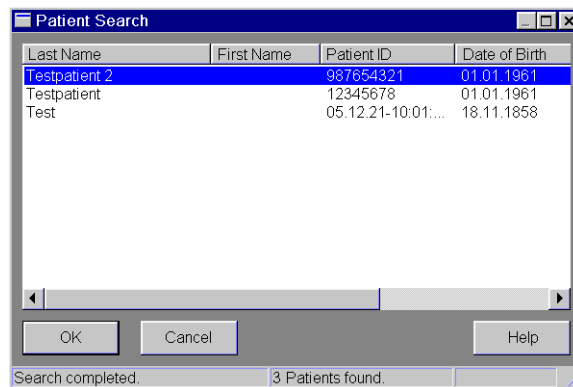
- ◆ Click **Search**.
  - The databases of your system are now searched for the patient with the data entered.
  - During the search, the **Cancel** button is displayed instead of the **Search** button. Thus you can cancel long search processes.



### *Accepting patient data*

If only one patient was found at the end of the search, this patient's personal data are automatically entered in the **Patient Registration** window.

As soon as a second patient is found, your system displays the **Patient Search** window with the hit list.



- ◆ Select the patient in the search list and click **OK**.

or

- ◆ Double-click the required patient.
  - The personal data of the selected patient, for preregistered patients all data entered previously, are transferred to the **Patient Registration** window.



*Repeat your search with changed entries and/or extend the search to further databases.*

### *Searching in the Patient Browser*

You can also use the **Patient Browser** to search for a patient in the scheduler, a database and in the “local archive” (inserted data medium). You can then transfer the data to the **Patient Registration** window. You can simplify your search by filtering and sorting the patient data.

(→ page 29)

- ◆ First select the database from which you want to transfer the patient data.
- ◆ Click the required patient entry in the navigation or content area of the **Patient Browser**.

— or —

- ◆ Select the study or studies of the patient that you want to perform or repeat.
- ◆ Press the key on the symbol keypad.

— or —

- ◆ Select **Patient > Register** to open the Patient Registration window.



## Completing your entries

After you have transferred the patient data you searched for into the **Patient Registration** window, check that the data are correct and, if necessary, add any missing data before registering the patient.

Exam

- ◆ Click **Exam** if you want to examine the patient next.
  - The patient is registered for examination.
  - The examination data are transferred to the **Examination** task card and you can begin the examination.

or

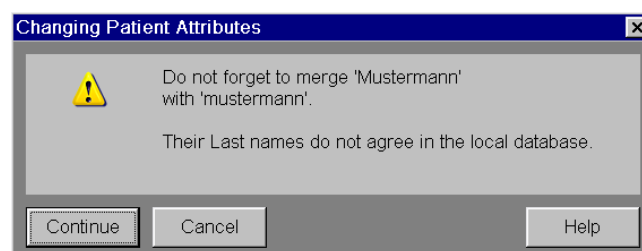
Preregister

- ◆ Click **Preregister** to preregister the patient.



The **Changing Patient Attributes** window is displayed.

If you have transferred the patient from the local database and made corrections to that patient's personal data, this message box appears.



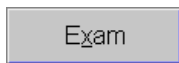
- ◆ Do not forget to correct the patient data in the original record later on.
- ◆ Close the message window with **Continue**.

### *Resuming a commenced study*

You can resume an incomplete study of a patient.

All newly generated images are appended to the existing study as a new series.

- ◆ Call up the **Patient Browser**.
- ◆ Select the relevant study.
- ◆ Call up the **Patient Registration**.



- ◆ Click the **Exam** button.
- The **Examination** task card is displayed and you can resume the study.

---

## Patient registration configuration

You can adapt patient registration flexibly to the individual requirements of your examination practice.

You can change the following default settings:

- ☐ The entries in the selection lists of the **Patient Registration** window.
- ☐ Selection of the databases that you want to be searched when using the search function and the search procedure and display of the search results.
- ☐ Worklist settings, if a HIS/RIS system is connected.

### Calling up the configuration window

You can call up the configuration window from the syngo Configuration Panel.

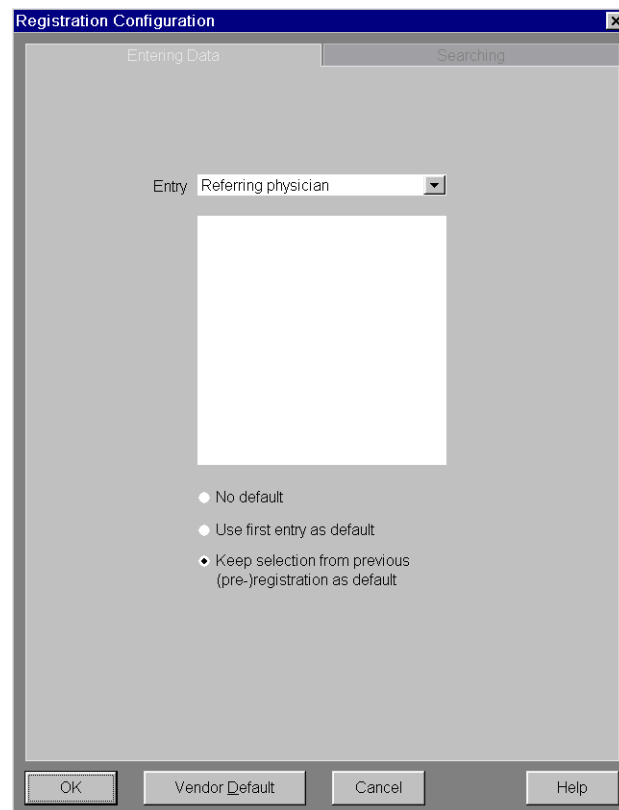
- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click on the Patient Registration icon.
- The **Registration Configuration** window is displayed with the **Entering Data, Searching,** and **HIS/RIS** cards.



*The **HIS/RIS** card is displayed only if your system is connected to a hospital or radiology information system and configured and licensed accordingly.*

### *Configuring selection lists*

In the **Entering Data** card you can create selection lists. During patient registration, you can then make use of these entries. In this way you save time during data entry and avoid typing errors.



#### **Possible selection lists**

You can change and add to the selection lists for the following input fields if these fields are shown in the **Patient Registration** window, e.g.:

- ☐ Referring physician
- ☐ Admitting diagnosis
- ☐ Ward
- ☐ Institution name
- ☐ Performing physician
- ☐ Operator

### Creating entries

You can create up to 50 entries for each selection list.



Dr. Winter  
Prof. Schwarzmann

- ◆ Under **Entry**, select which selection list you want to edit.
- ◆ Enter new entries in the text input field below and correct or delete the existing entries.



*The entries are automatically sorted in alphabetical order.*

### Defining default entries

For each selection list you can define whether and which entries are preselected in an input field when you call up patient registration.

- ☐ No default
- ☐ Use first element as default
- ☒ Keep selection from previous (pre-)registration as default

- ◆ Select **No default**.
  - When you call up patient registration, the input field is empty.
- or
- ◆ Select **Use first element as default**.
  - When you call up patient registration, the first entry from the selection list is already in the input field.
- or
- ◆ Select **Keep selection from previous (pre-)registration as default**.
  - When you call up patient registration, the entry you selected for the last patient you (pre-)registered is already in the input field.

## Configuring patient search

In the **Searching** tab card you can define which databases are to be searched during a patient search, after how many hits the search is terminated, and what information the search list is to contain.

Registration Configuration

Entering Data

Searching

Where to search

☒ Scheduler database

☒ Local database

☐ Local archive

Stop searching after

25

patient(s) found

Columns of search list

	Pos.	Width	Show		Pos.	Width	Show
First name	2	10	<input checked="" type="checkbox"/>	Height			<input type="checkbox"/>
Middle name			<input type="checkbox"/>	Weight			<input type="checkbox"/>
Last name	1	14	<input checked="" type="checkbox"/>	Additional info			<input type="checkbox"/>
Title			<input type="checkbox"/>	Institution name			<input type="checkbox"/>
Suffix			<input type="checkbox"/>	Referring physician			<input type="checkbox"/>
Patient ID	3	10	<input checked="" type="checkbox"/>	Ward			<input type="checkbox"/>
Date of birth	4	11	<input checked="" type="checkbox"/>	Location	5	18	<input checked="" type="checkbox"/>
Sex			<input type="checkbox"/>				
Age			<input type="checkbox"/>				

OK

Vendor Default

Cancel

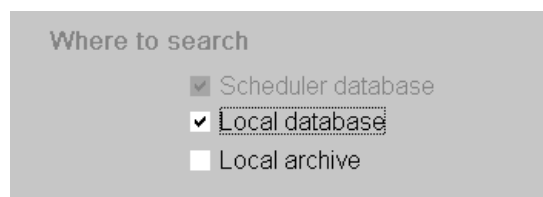
Help



### Specifying databases

During a patient search the following databases can be searched:

- ☐ Scheduler database  
(contains all patients preregistered at your system)
- ☐ Local database  
(contains all patients who were examined at your system in the past and whose data have not yet been deleted)
- ☐ Local archive  
(contains all patients that are stored on the data media currently inserted)



Where to search

- ☒ Scheduler database
- ☒ Local database
- ☐ Local archive

- ◆ Select the databases that you want to search during the patient search.



*It is not possible to exclude the scheduler from the search.*

### Limiting the number of patients found

You can have the search stopped once a certain number of patients have been found.



Stop searching after

25 patient(s) found

- ◆ Enter after how many hits you want the patient search to be stopped.

### Defining the display of the search list

Here you can select which data items of the patients found will be listed in the **Patient Search** window and how the display is to appear.

You can have the following information displayed:

☐ Personal data

You can have some or all of the information that you have entered in the **PATIENT** area displayed in the search list.

☐ Admission data

Information about the referring physician and ward from the **HOSPITAL** area.

☐ Information about hospital/practice

The name of the hospital/practice that you have entered in the **INSTITUTION** area.

☐ Location

The network node where the data of the patient displayed in the search list are stored.

Pos.

◆ Enter the column of the search list in which the information is to be entered.

Width

◆ Enter the column width (number of characters).

Show  
☒

◆ Click the information that you want to display.

## *Introduction to the Patient Browser*

The **Patient Browser** supports you in the administration of patient and examination data stored in the databases of your system.

With the **Patient Browser** you can search for data fast and easily and then process the data in the browser or in the task cards.

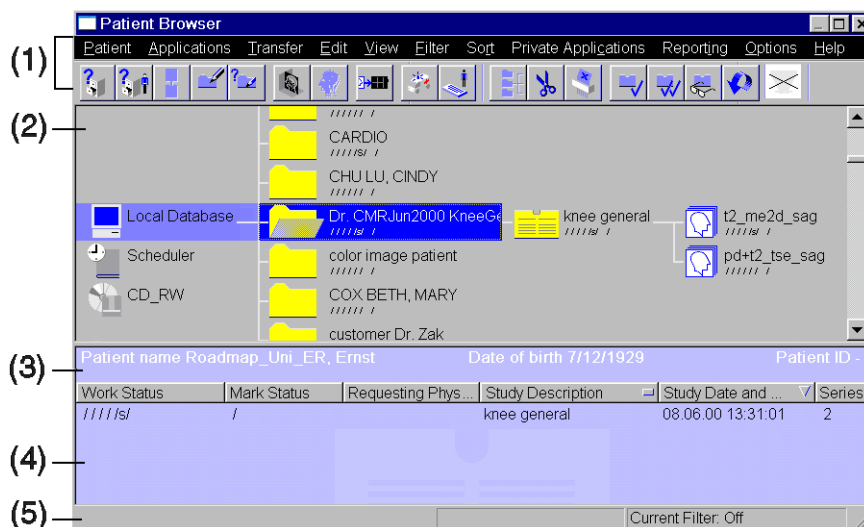
### **When to use the Patient Browser**

- ☐ To examine a patient who has already been examined once before with your system and whose data are still saved in the local database.
- ☐ To view the images of a patient from earlier examinations in order to compare them with current results
- ☐ To comment or postprocess images after an examination
- ☐ To correct incorrect information on a patient stored in your system
- ☐ To archive patient and examination data or to send them to another location in your hospital via the network
- ☐ To expose images of a patient onto film for reporting or documentation purposes

## *The Patient Browser window*

When you call up the **Patient Browser**, the **Patient Browser** window is displayed and placed in the foreground.

The window is subdivided into various processing areas and therefore provides you with access to your data in a clearly laid out manner.



- (1) Menu and tool bar
- (2) Navigation area
- (3) Information area
- (4) Content area
- (5) Status bar

**Tool bar** You can edit the data you have selected using the menus or the icon buttons on the tool bar.

**Navigation area** The lower data levels for the selected databases, patients, studies and series are displayed graphically in the navigation area.

**Information area** In the information area you can see brief information about the patient and study selected.

**Content area** The content area contains a list of the studies or procedure steps for the patient selected in the navigation area. If you select the lower data levels, you can see which series or procedure steps are stored for a study and which images or action items are stored for a series or procedure step.

---

## Databases and drives

In the **Patient Browser** you access patient and examination data stored in the different databases of your system or on external data media such as CDs.

### Local database



The local database is the area of your system where patient data and results of current examinations are stored.



*As the data volume in the local database increases, access times become longer and examinations are slowed down. Therefore you should regularly move data from your local database to archive media.*



*If patient data are saved only locally, they will no longer be available once they have been deleted. If follow-up studies need to be performed, the patient must be registered again.*

*If you have saved the data in an archive on the network, they will still be available even after the patient has been deleted from the local database.*

### Scheduler



The scheduler contains the data of all preregistered patients. This database gives you an overview of all patients who have been preregistered for examination. Here you can search for patients you want to register for an examination.

If available, the **HIS/RIS worklist** is displayed in the scheduler.



*The **Clear Scheduler** function allows you to delete certain scheduler entries in one step.*

*(→ page 50)*

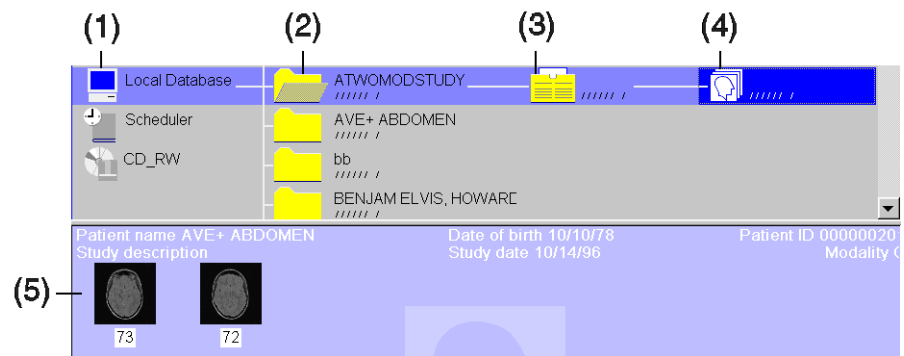
### Connected drives



One or more CD drives are connected to your system. The icons with the drive names provide a quick way of accessing these archiving media. As soon as an examination has been completed and evaluated, you should archive the examination data and then delete them from the local database.

### *Data levels*

In the databases and on the external data media, the patient and examination data are structured hierarchically. This structure helps you find examination results quickly.



- (1) Database
- (2) Patient
- (3) Study
- (4) Series
- (5) Images



*The display of the data levels depends on the configuration.*

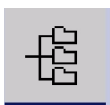
---

## *Searching for and displaying patient data*

In the **Patient Browser** window you can view all the patient and examination data stored in the databases of your system or in the main databases of other network nodes (if connected) and on external archiving media.

### **Calling up the Patient Browser**

You can call up the **Patient Browser** window either from the main menu or by using the symbol keypad.



- ◆ Press the **Patient Browser** key on the symbol keypad.

or

- ◆ Call up the **Patient Browser** in the main menu by selecting **Patient > Browser**.

## *Data at the workstation*

You can search for patient data in the Patient Browser by navigating through the data levels of the window by mouse click or using the keyboard.

You can speed up your search by sorting the data displayed, e.g. alphabetically by the last name of the patient. You can also filter the data displayed and only view a certain subset.

### *Opening a data level*

To select certain images of a patient for processing, you can open the information levels patient, study, and series one after the other until the images you require are listed or displayed (as image stamps) in the information area.



- ◆ Click on individual data objects in the navigation area to open all the associated entries of lower data levels.

### *Filtering data*

When filtering your data you can use filter criteria that are offered by default by your system. These are available to you on the menu bar or with the buttons on the tool bar.



Using the **Patient Browser** you can also create your own filter criteria in order to filter the database according to a combination of target items. You can call up the **Filter Specification** window with **Options > Filter Settings**.

#### **Activating a filter**

- ◆ Select one of the filter criteria in the **Filter** menu of the **Patient Browser**.

or



- ◆ Select a standard filter from the tool bar.



In the **Browser Configuration** dialog window you can define which filter icons are displayed on the tool bar. To display this dialog box, select **Options > Configuration**.

(→ page 51)

#### **Deactivating the filter**

- ◆ Select **Filter > Off**.

or



- ◆ Click on the icon button to have all the data displayed again (unfiltered).



### *Sorting data*

You can sort the data displayed in the Patient Browser by various criteria. This enables you to output the data in a certain sequence and makes it easier to find certain patient and examination data.

- ◆ Select a data level in the navigation area.
- ◆ Open the **Sort** menu.



*Depending on the data level displayed in the content area, different sorting criteria will be provided.*

- ◆ Click on one of the sorting criteria offered.

### *Data on external exchange media*

You can import patient and examination data archived or exported onto a data medium in DICOM format into your system (into the local database) if a drive has been installed and configured appropriately.

#### **Importing data**



- ◆ Insert the required data medium.
- ◆ Click on the icon of a data medium in the navigation area.
- ◆ Select the required patient data from the data medium in the navigation area.
- ◆ Select **Transfer > Import**.

— or —



- ◆ Click the icon button on the tool bar.
- ◆ Select **Transfer > Eject from...** to remove the data medium.

## Data in the network

Patient and examination data stored on other workstations or in a long-term archive can be accessed via **Patient Search**. Import the required data into your local database via the network so you can process and evaluate them on your workstation.

### Calling up Patient Search

- ◆ Select **Patient > Search**.

— or —

- ◆ Click the icon button on the tool bar.



*If you need further data on a patient stored in your local database, select the patient in the **Patient Browser** and call up **Patient > Search Selected**. The search window will then already contain the search mask for the relevant patient.*

- The **Patient Search** dialog box is displayed.

—

(1) —

(2) —

(3) —

- (1) Input fields for search criteria (search mask)
- (2) List of search details
- (3) Display of search results

### Starting a search

- ◆ Enter the known patient data and further search details, if necessary.



*Unknown data can be replaced by the wildcard " \*", e.g. T\*.*

- ◆ In the **Node** field, specify the network node where you want to search for the data.

A rectangular button with a light gray background and a thin blue border. The word "Search" is written in a dark gray, sans-serif font.

- ◆ Start the search by clicking the **Search** button.

- The patients, studies and series found are displayed in the results area of the **Patient Search** dialog box.



*To display a list of all images of a series selected in the results area, click the **Image List** button.*

### Importing data

---

#### CAUTION

Receipt of images of a patient listed under different personal data in the local database and on the sending network node (e.g. after patient was renamed on the network node).

**Possible loss of data since the images are assigned to the patient with the original personal data in the local database.**

- ◆ In this case, search for the imported data with the **Patient Browser** using suitable search and filter criteria.
- ◆ If necessary, correct the personal data of the patient concerned in your local database.

A rectangular button with a light gray background and a thin blue border. The word "Import" is written in a dark gray, sans-serif font.

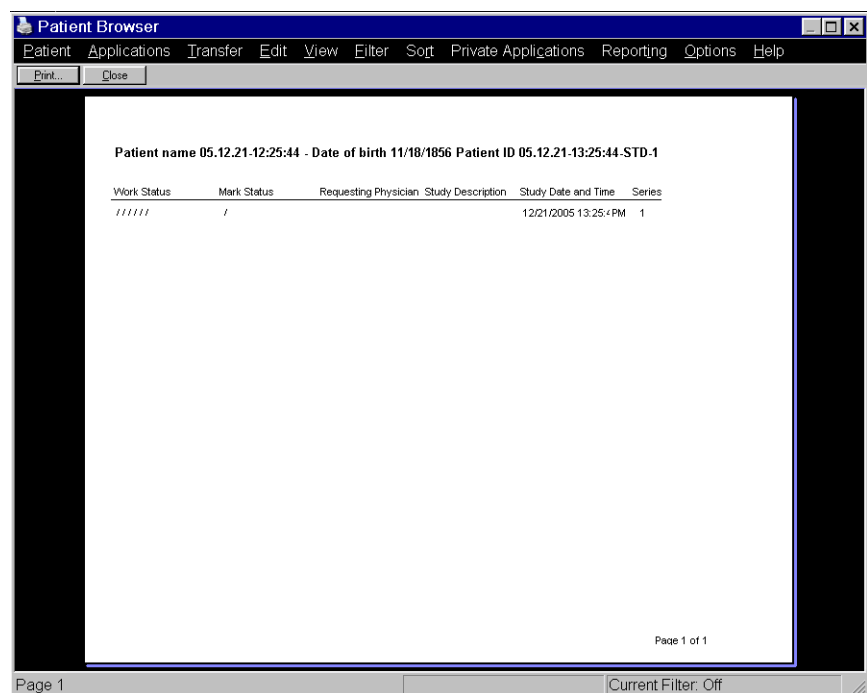
- ◆ Select the required data in the results area (or in the image list).
- ◆ Click the **Import** button.
- The selected data are copied from the network node to your workstation and displayed in the navigation and content area of the **Patient Browser**.

## Printing a data list

If a printer is connected, you can print a list of examination data. When printing data, the information displayed in the content area is processed.

### Displaying a print preview

- ◆ Display the required patient and examination data in the content area.
- ◆ Select **Patient > Print Preview**.
- A print preview of the data list is displayed.



### Printing

◆ Select **Patient > Print List**.

— or —

◆ Click **Print** in the **Print Preview**.

– The data list is printed on the default printer.



*If you wish to print on another printer, select **Patient > Print**. You can now change the print settings in the dialog box displayed.*

## Updating and deleting data

Every now and then it is necessary to add or correct patient data or information relating to the study of a patient (e.g. emergency patient). You use the **Patient Browser** to search for the patient in the database and to edit the corresponding data.

With the DICOM MPPS option the system automatically generates a performance report for each examination which you complete and terminate after the examination and postprocessing.

Once the examination data have been successfully archived and are no longer needed, you can delete them from the local database.



*Please note that when deleting large amounts of data part of the system resources will be occupied for a while (up to 30 minutes for deleting all data with completely filled database). During this time the system performance during examinations with high image storage rates may be restricted.*



*To avoid interfering with routine clinical procedures, we recommend that updates, deletion and archiving of data be performed during times when the mobile C-arm system is not used.*

## Changing patient or examination data

The described functions for changing patient and examination data are used for correcting the local database.

### Possible changes

You have the following possibilities of changing data:

- ☐ Correcting data in the **Correct** dialog box.
- ☐ Rearranging patient data in the **Patient Browser**.

### External data

If you change a data set that has also been sent to another network node, please note the following: The changes affect the local database. The corresponding data set is not automatically updated on other network nodes. This can lead to inconsistencies between the local data set and the exported data set.

You have two possibilities to avoid these inconsistencies:

- ☐ Besides the local data set, you also correct all relevant data sets on other network nodes.
- ☐ You delete all relevant data sets on other network nodes and resend the corrected data sets.

### *Safety notes for changing data*

When correcting and rearranging examination data, make sure that the images are assigned correctly and these changes are also made on the other network nodes.

---

### CAUTION

Correcting/rearranging objects with references.

#### **References may be lost!**

- ◆ Rearrange the entire hierarchical group containing all objects with references in order to maintain the references.

---

### CAUTION

Rearranging of series/images into another series may lead to wrong image information, if the selected images/series are not compatible.

#### **Wrong diagnosis due to incorrect image information!**

- ◆ Correct the attributes which do not correspond, before you rearrange the series/images.



*Please terminate the active study of the patient before correcting examination data of this patient.*



## Correcting data

Patient and examination data can be changed and added to in the **Correct** dialog box.

### Calling up the dialog window **Correct**

- ◆ Select the patient, study, series or images that you want to correct in the navigation or content area of the **Patient Browser**.

- ◆ Select **Edit > Correct**.

— or —



- ◆ Click on the icon button on the tool bar.

– The **Correct** dialog box opens.

**Correct**

"06.03.01-15.33.34-STD-STD" on "Local"  
1 Patient selected

Modifier's name: testuser

**(1) Patient**

Last name: 06.03.01-15.33.34-STD-STD  
Patient ID: 06.03.01-15.33.34-STD-1.3.12.2.1107

First name:   
Middle name:   
Title:   
Suffix:   
Other Patient name(s):   
Other Patient ID(s):   
Ethnic group:   
Military rank:   
Date of birth: 11/18/1858  
Sex: ☐ Male ☒ Other ☐ Female ☐ Not Set  
Height [ft]:   
Weight [lb]:   
Address:   
Additional info:

**(2) Hospital**

Referring physician:   
Admission ID:

**(3) Study**

Accession No:   
Study ID: 1

**Series**

Series description:   
Series date:

**Instance**

Number:   
Comment:

OK Cancel Help

- (1) Name and number of selected data
- (2) Entry form for correction data, divided in data areas
- (3) Entry cards for details of the individual data

### Entering data

In the input and selection fields of the **Correct** window you can see the information that has been stored for the selected patient or selected study or series so far.

- ◆ Correct or add to the selected data.



*Depending on the data level in which you want to correct data, some fields of the **Correct** dialog box might be dimmed. Data marked by "\*" cannot be changed.*



*When you enter very long comments in the **Comment** input field, only the first part of the text is displayed in the **Viewing** task depending on the selected layout. A third or fourth comment line is not displayed, either.*

### Signing for changes

A text input field with a grey border and a dropdown arrow on the right. The text "Modifier's name" is displayed in the field.

- ◆ Enter your name under **Modifier's Name**.

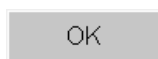
— or —

- ◆ Select your name in the selection list.



*If you do not specify a name, the name with which you logged on to the system is taken as the modifier.*

### Saving changes

A rectangular button with a grey background and the text "OK" in the center.

- ◆ Click **OK**.
  - The changes are saved and included in the history of changes.

---

**Merging patient data**

A patient whose name was spelt incorrectly during an examination or who was once registered as an emergency patient is stored in the database twice.

As soon as you save the corrected patient name, the dialog box asks you whether you want to merge the examination data of the two patient entries or not.



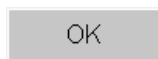
---

**CAUTION**

Patient data are merged.

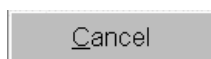
**Examination data may be assigned to the wrong patient!**

- ◆ Before confirming the message, make sure that the patient is one and the same.



- ◆ Click **OK**.
  - All selected data are stored under the corrected patient name.

or



- ◆ Click **Cancel**.
  - The correction of the data is canceled. No changes are made.

### *Rearranging data*

The study images of a patient are grouped hierarchically by series and studies. If required, you can change this assignment in the **Patient Browser**.



*Data can be rearranged only within a patient entry.*

The following restrictions apply for rearranging data:

- ☐ Only images of the same application area that were acquired in the same patient position can be merged.
- ☐ The data hierarchy must be maintained, e.g. a study cannot be subordinated to a series.
- ☐ Delete-protected data or data currently loaded in an application cannot be edited.

### **Moving data**

- ◆ Select the study, series or images in the **Patient Browser**.
- ◆ Move the selected data to the required position by drag & drop.
  - The **Rearrange** dialog box for confirming your changes is displayed.

### **Signing for changes**

Modifier's name

- ◆ Enter your name under **Modifier's Name**.

— or —

- ◆ Select your name in the selection list.



*If you do not specify a name, the name with which you logged on to the system is taken as the modifier.*

OK

- ◆ Click **OK**.
  - The changes are saved and included in the history of changes.

## History of changes

The history of changes is a type of logbook of your local database that is created separately for each data level. Here you can always see what changes and additions have been made to the data of patient and to the information about the patient's examinations.

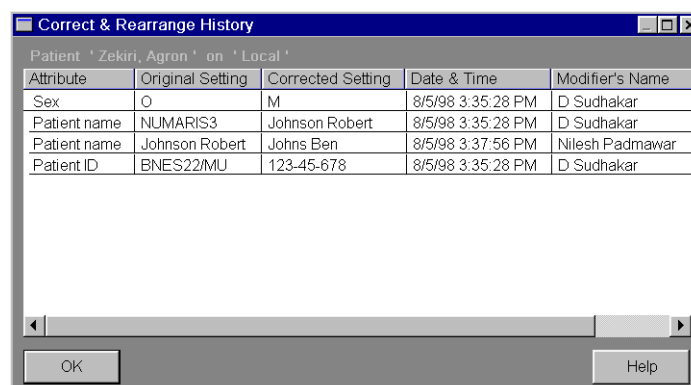
### Opening the history of changes

- ◆ Select the patient, study, series or image stored in the local database whose history of changes you want to view.
- ◆ Select **Edit > History**.

or



- ◆ Click the icon button on the tool bar.
- The **Correct & Rearrange History** window is displayed with a chronological list of changes.



Depending on the hierarchy level of the selected data, different information is listed in the **Correct & Rearrange History** window.



If an object has been moved, the entry is marked with ">" under Attribute in the **Correct & Rearrange History** window.

### Closing the history



- ◆ Click **OK**.
- The the history display is closed.

### *Changing the work status*

The work status indicates the processing stage of patient and examination data. This status is indicated as an abbreviation in every list entry in the content area. All work statuses with the exception of "rea" and "ver" are automatically set by the system.



*Under Transfer Configuration you can specify that data must have reached a certain work status before they can be archived and sent.*

#### **Entering the status manually**

As the user you can set the following entries for studies and series in your local database:

- ☐ com/... Completed
- ☐ ver/... QA Verified
- ☐ rea/... Read

◆ Select **Edit > Set State** and select the work status you want to assign.

— or —



◆ Click the appropriate button on the tool bar.

– The work status of the selected data objects is changed correspondingly.

## Performance Documentation (MPPS)

If the DICOM MPPS option is installed, your system creates a performance report during patient registration. During examination and postprocessing of the examination results, the report is updated.

Before you conclude your work on the examination by archiving, check and add missing entries to the performance report.

- ◆ Select the patient, the study, or one of the associated series or images from the **Patient Browser**.

- ◆ Select **Patient > Show MPPS**.

or



- ◆ Click the icon button on the tool bar.
- The **Modality Performed Procedure Step** window is displayed.

**Modality Performed Procedure Step**

PATIENT	STUDY
Patient name : Patient Patient ID : 04.12.16-10:11:28-STD-1.3.12.2.1 Date of birth : 11/18/1858 Sex : other	Study description : Modality : XA Accession No. : Station : YBFR001176 Study ID : 1

**MPPS**

Description :   
 Status : IN PROGRESS

Comments

**Actions**

Performed actions

Action Code	Action Item

**Dose**

Performed series

Series Description	Protocol	Performing Physician	Operator	Retrieved AE Title
Cont.	Ortho/TraumaAll body...			
Cont.	Ortho/TraumaAll body...			
DR	Ortho/TraumaAll body...			

**Billing**

Completed Discontinued Save Cancel Help

### *Adding data*



- ◆ Enter a comment and a short description in the **MPPS** area, if necessary.
- ◆ Enter all performed actions in the table on the **Actions** card.
- ◆ Click the **Billing** card in the foreground and enter all action steps, the film consumption and the material into the tables.
- ◆ If you want to annotate the applied radiation dose, click the **Dose** card in the foreground and enter the text into the lower **Comment** field.

### *Sending and concluding a report*

If all data in the performance report are entered correctly, you can close the report and therefore also the examination. If further working steps are planned, you can save the report temporarily and conclude it later.

Depending on operational requirements, you can pass the report on to the HIS/RIS system.

#### **Saving a report**



- ◆ Click the **Save** button.
  - Your entries are saved to the report and the **Modality Performed Procedure Step** window is closed.



---

### Concluding a report

Completed

- ◆ Click the **Completed** button to conclude the report and the examination.
- The report and the examination is concluded.



*A message indicating this is sent to the HIS/RIS system, if connected. You can no longer make changes to the performance report.*

### Exiting a report as discontinued

Discontinued

- ◆ Click the **Discontinued** button.
- The examination is no longer continued.



*The report is also closed with that. A message indicating this is sent to the HIS/RIS system, if connected.*

### *Deleting data*

If an examination has been completed and all the examination results and images have been reviewed and commented, you can archive the data and then delete it from the database.

(→ Register 6: Filming/Printing and Archiving, **page 63**)

(→ Register 6: Filming/Printing and Archiving, **page 67**)

### *Deleting patient data*

You can delete existing data in the navigation or content area.

---

#### **CAUTION**

Deleting non-archived images

##### **Data are irretrievably lost!**

◆ Before deleting images, make sure that these were archived correctly.

◆ Select the data you want to delete.

◆ Select **Edit > Delete** in the main menu of the **Patient Browser**.

— or —



◆ Click on the icon button on the tool bar.

– A dialog box is displayed in which you have to confirm again that you really want to delete the selected data.

## Protecting data from deletion

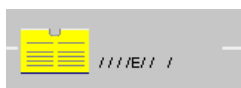
You can protect patient and examination data from accidental deletion.

- ◆ Select the data that you want to protect against deletion in the navigation or content area.
- ◆ Select **Edit > Protect** in the main menu of the **Patient Browser**.

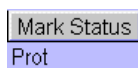
— or —



- ◆ Click on the icon button on the tool bar.
- You can now no longer simply delete the selected data. Delete protection always includes all lower data levels and the related entries of the higher data levels. For example, if you protect a study entry you can no longer delete the individual images of that study nor the patient entry. Delete protection can be identified by the mark status "prot".
- Delete protection can be identified by the mark status "prot".



—



*Data that you have assigned delete protection to, are protected from both moving and correction.*

## Removing delete protection

If you want to correct, move, or delete data without a message box being displayed, you must remove the delete protection again.

- ◆ Select **Edit > Remove Protection** in the main menu.

— or —

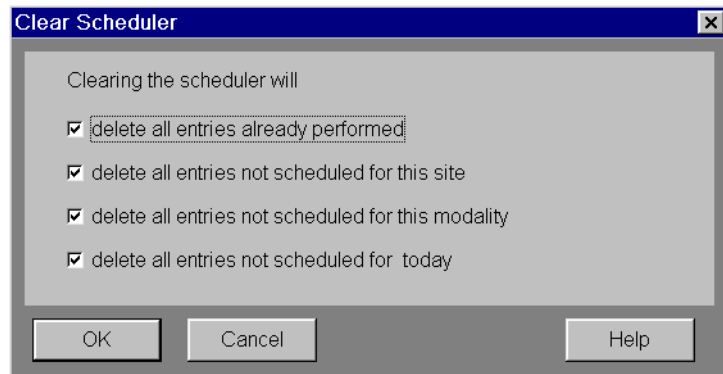


- ◆ Click on the icon button on the tool bar.
- Delete protection is removed.

### *Deleting data in the scheduler*

The **Clear Scheduler** function allows you to delete certain scheduler entries in one step.

- ◆ Select **Edit > Clear Scheduler** in the menu bar of the **Patient Browser**.
  - The **Clear Scheduler** dialog box is displayed.



- ◆ Select the entries to be deleted by ticking the relevant check boxes.
- ◆ Confirm your selection with **OK** to save your settings and delete the corresponding procedure steps.

---

## Patient Browser Configuration

With the **Browser Configuration** dialog box you can adapt the **Patient Browser** to your method of working.

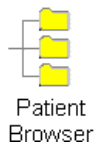
You can change the following settings:

- ☐ General settings such as the layout of the tool bar, the display of the work status and the link to individual network nodes (in preparation).
- ☐ The hierarchical view of the information levels (patient, study, series, image) in the navigation and content area.
- ☐ The display of the individual information levels (study, series, image) in the content area.
- ☐ The selection lists in the **Patient Search** window.

### Calling up configuration windows

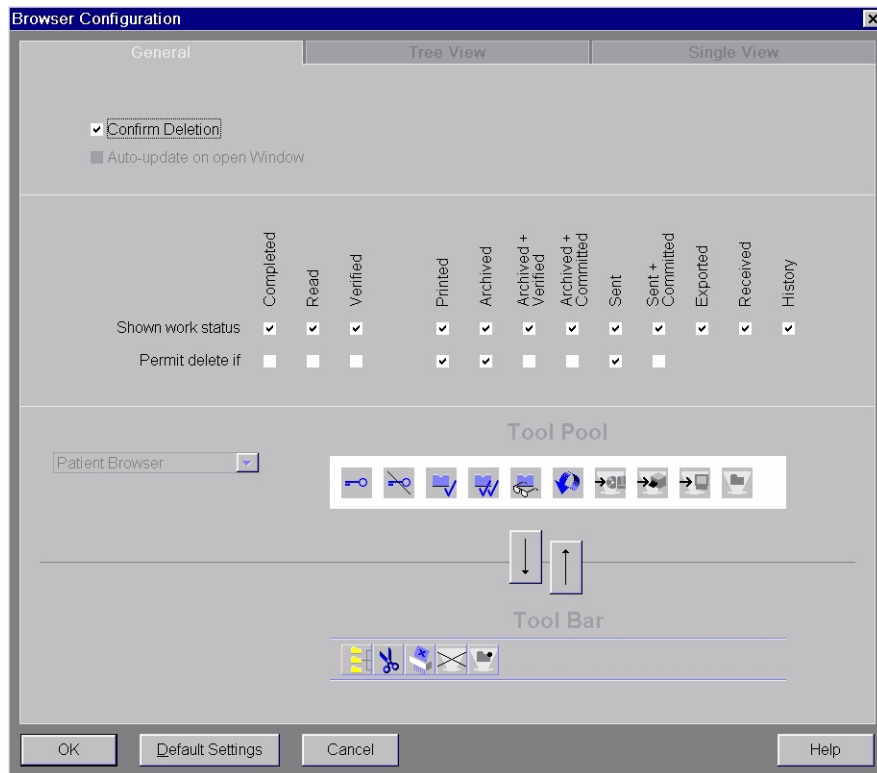
You can call up the configuration window from the syngo Configuration panel.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click on the **Patient Browser** icon.
- The **Browser Configuration** window with the tab cards **General**, **Tree View** and **Single View** is displayed.



## General settings

On the **General** tab card you can configure the tool bar of the **Patient Browser**, define which work status is displayed for the examination data, and set the influence of the work status on delete permission. And finally, here you can establish the links to network nodes.



## Configuring the tool bar

You can place buttons for the functions of the **Patient Browser** that you require frequently on the tool bar and remove rarely-used functions.



- ◆ Select an action that you want to place as an icon button on the tool bar from the **Tool Pool**.



- ◆ Click on the **Arrow down**.
  - The selected button is displayed in the **Tool Bar**
- ◆ Repeat this step until the **Tool Bar** contains all the buttons you require.



*Deselect the buttons that you do not require using the **Arrow up** key.*

*Work status*

In the middle part of the **General** tab card you can define which work status is displayed in the content area for the examination data and in which processing state data is released for deletion.

**Showing work status**

	Completed	Read	QA Verified		Printed	Archived	Archived + QA Verified	Archived + Committed	Sent	Sent + Committed	Exported	Received	History
Shown work status	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- ◆ Select the check box for a work status if you want this work status to be displayed in the content area of the **Patient Browser**.

**Defining delete authorization**

Permit delete if	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
------------------	-------------------------------------	-------------------------------------	-------------------------------------	--	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------	-------------------------------------

- ◆ Select the check box of a work status.
- Data without this status cannot be deleted without explicit confirmation in a message box.



### *Delete confirmation*

The default setting is to have your system display a confirmation window before each deletion even if the data concerned have already reached the work status required for deletion. You can activate and deactivate this confirmation in the configuration.

---

#### **CAUTION**

Deletion confirmation has been deactivated

#### **Potential loss of data!**

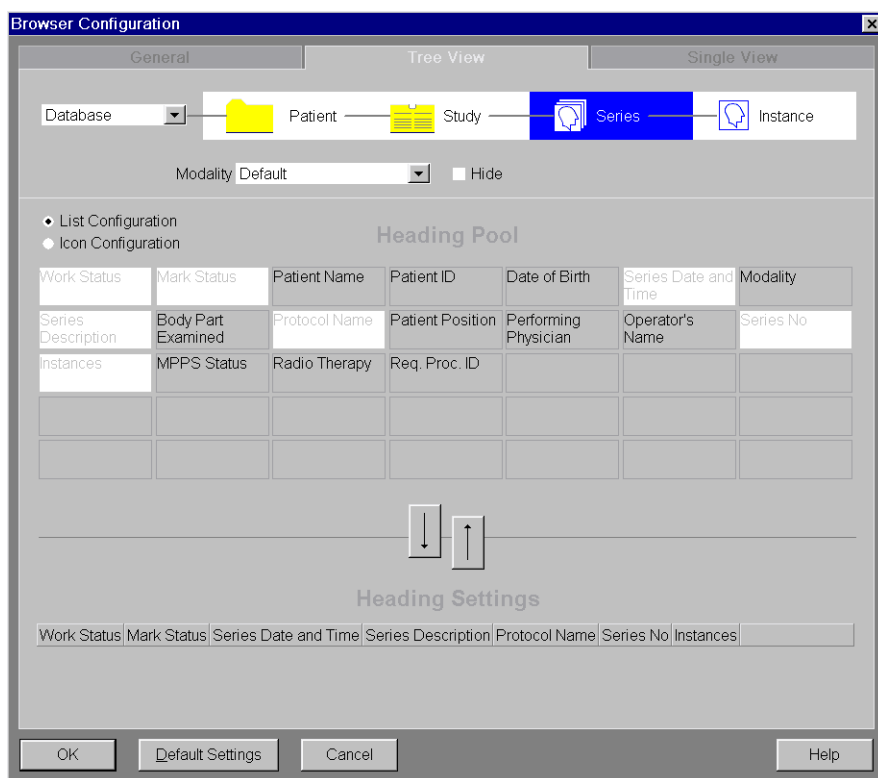
- ◆ Delete confirmation should always be activated.
- 

☒ Confirm Deletion

- ◆ Click the **Confirm Deletion** check box.
  - A confirmation box is displayed every time before data is deleted.

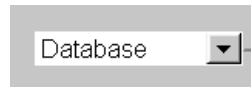
## Tree view

On the **Tree View** tab card you can define what information is listed in the content area of the **Patient Browser** in the hierarchy levels (e.g. patient). You can also hide hierarchy levels in the navigation and content areas and configure the icon display of series and images.



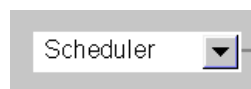
---

### Selecting a database and a data level



- ◆ Select **Database**.
  - The local database view is configured.

or



- ◆ Select **Scheduler**.
  - The display of preregistered patient data is defined in the **Patient Browser**.



- ◆ Select the data level for which you want to define the entries.

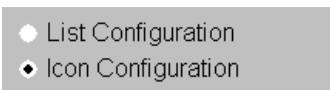


*The names and information that appear on the card Tree View for the different data levels differ depending on the database that you have called up (e.g. **Study** in the local database corresponds to **Procedure** in the scheduler).*

### *List entries*

For the "Series" and "Instance" data levels you configure the display of the list and of the icons.

#### **Selecting list / image stamp display**

- 
- List Configuration  
◆ Icon Configuration

- ◆ Select the display option for which you want to define the entries.

#### **Making entries**

- ◆ In the **Heading Pool** select which entries you want to have displayed in the content area.



*Select the entries in the sequence in which you want to have them displayed in the table.*



- ◆ Click on the **Arrow down** to place the entry in the **Heading Settings** for the table in the content area.



*Using the selection list **Modality**, you can define the entries depending on the imaging modality or the data type.*

### *Hiding data levels*

You can define whether the hierarchy levels, examination, series, or instance are displayed in the navigation and content area.



☒ Hide

- ◆ Click on the **Hide** check box to hide this data level.

# Single view

In the card **Single View**, define to which hierarchy level data are to be displayed if the navigation area is hidden. Each data entry is displayed in exactly one line.

Browser Configuration

GeneralTree ViewSingle View

Database

Display Level

PatientStudySeries

Level Patient

Heading Pool

Work Status	Mark Status	Patient Name	Other Patient Names	Patient ID	Other Patient ID's	Date of Birth
Sex	Ethnic Group	Military Rank	Additional Info	Medical Alerts	Patient Status	Contrast Allergies
Studies	Series	Instances	MPPS Status			

Heading Settings

Patient NameStudy Description

OKDefault SettingsCancelHelp

### *Selecting a database and a data level*

- ◆ Select the database that you want to configure from the selection list.



- ◆ With the radio button **Display Level** you can select the data level that you want to have displayed when switching from the **Tree View** to the **Single View** in the content area.



*In the single view, the content area always shows the same data level.*

List entries

You can combine list entries of different information levels by varying the data level for the pool in the Heading Pool from which you then select the required entries.

Defining data entries for Heading Pool

Level 

Series

- ◆ Define the data level in the selection list from which you want to take list entries for the content area in the **Heading Pool**.
  - In the **Heading Pool** area all the possible list entries from the selected information level are displayed. The currently selected list entries are highlighted.

—

Heading Pool						
Work Status	Mark Status	Patient Name	Other Patient Names	Patient ID	Other Patient ID's	Date of Birth
Sex	Ethnic Group	Military Rank	Comment	Medical Alerts	Patient Status	Contrast Allergies
Studies	Series	Instances	MPPS Status			

Making entries



- ◆ Click on a list entry in the Heading Pool and move it with the arrow down key into the **Heading Settings**.

Level 

Patient

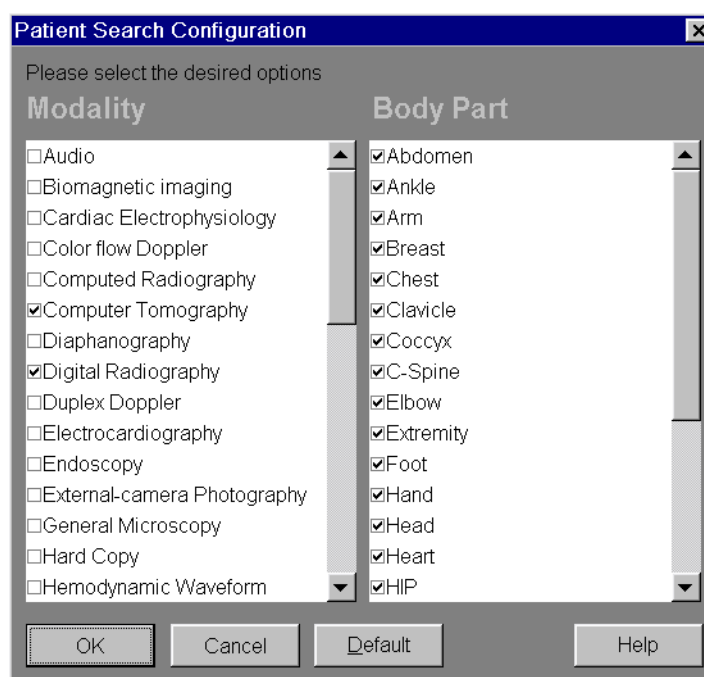
PatientStudySeries

- ◆ Now select another **Level**, if necessary, to place list entries of another data level from the **Heading Pool** into the **Heading Settings**.

## Configuring the patient search

You can adapt the user interface of the **Patient Search** dialog window to your method of working. The dropdown lists of the search criteria **Modality** and **Body Part** are configurable.

- ◆ Call up the syngo **Configuration Panel** by activating **Options > Configuration** in the main menu.
- ◆ Double-click the **Patient Search** icon.
  - The **Patient Search Configuration** window appears.



- ◆ Select or deselect the desired items by clicking or deselecting the corresponding check box.
- ◆ Click the **OK** button.
  - The settings you have made are saved.





# SIEMENS

## Operator Manual ARCADIS Avantic Examination

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

## Safety information relating to the examination procedure

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---

## *Safety information relating to the examination procedure*

### *Prior to the examination*

---

#### **WARNING**

Incorrect image position displayed on the monitor

##### **Operative intervention at the wrong position!**

- ◆ Use lead letters as orientation aids during the exposure.
- 

#### **Integrated I.I.-laser aimer**

Depending on the configuration of your ARCADIS Avantic, you can use the integrated I.I. laser aimer for positioning the patient.

---

#### **WARNING**

Laser radiation

##### **Danger of eye injury!**

- ◆ Do not view the beam using optical instruments (Class 1M laser)
- 

#### **Single-tank-laser targeting device**

Depending on the configuration of your ARCADIS Avantic, you can use the single-tank -laser targeting device for positioning the C-arm.

---

#### **WARNING**

Laser radiation

##### **Danger of eye injury!**

- ◆ Do not look directly into the laser beam (Class 2 laser).
- 

#### **Examination settings**

Before starting surgery, please make sure that all the set parameters as well as examination settings in all operating modes are correct.

#### **Software failure**

In the event of a software failure the ARCADIS Avantic can be restarted.

## Storage capacity



The hard disk usage is displayed in the status bar of the left monitor. A warning signal is displayed before the final capacity of the hard disk is reached.

This icon for instance indicates, that about 10 percent of the disk is occupied.



*Please make sure that there is sufficient storage capacity before you start the examination. In addition, please note the relevant system messages.*

## Reference images from previous examinations

Since permanent network functionality cannot always be guaranteed, reference images should be loaded from the network archive before starting an examination.

## During the examination

Prior to the release of radiation, it is necessary to check whether the patient is positioned correctly.

Correct image orientation (accurate to side) on the monitor and/or film must be observed.

Correct orientation of image and patient data must be checked before storage.

Before terminating an examination and beginning work on the next patient, the patient data should be verified.

The registered patient should be deselected at the end of the examination.  
(→ page 16)



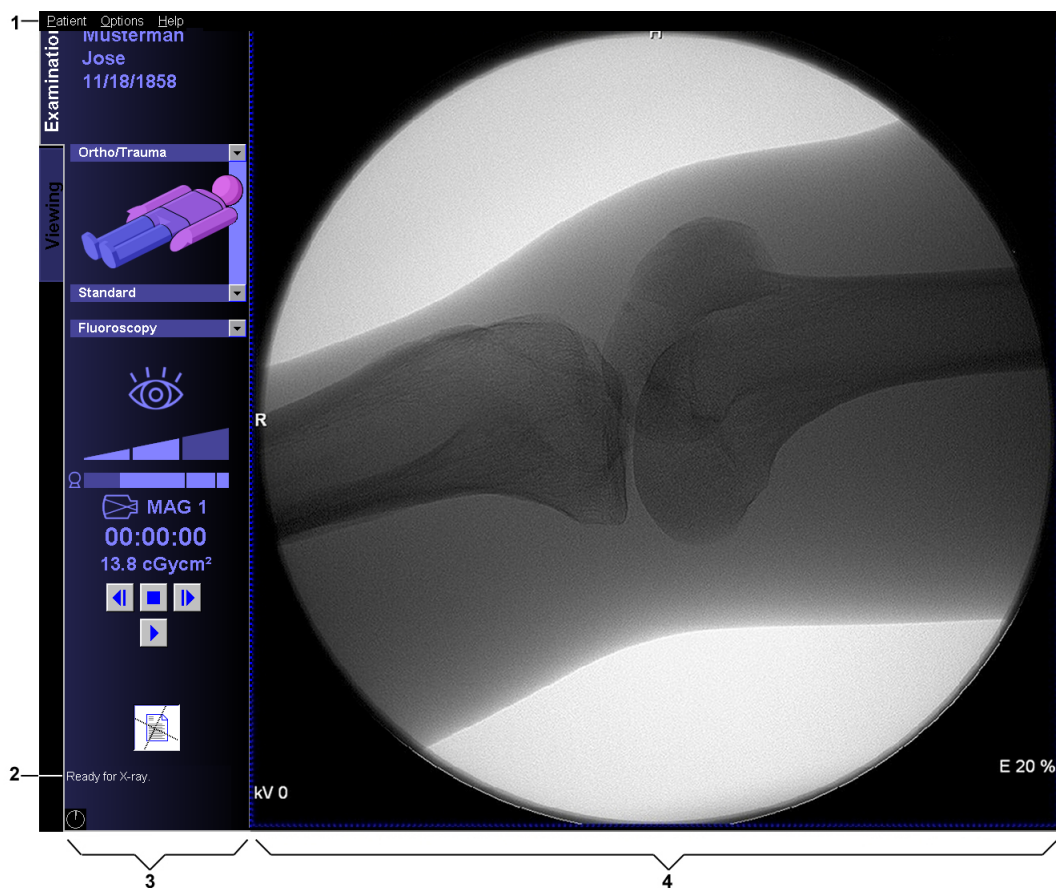
*If the examination program used is configured in such a way that all images are saved, you must limit the series length to less than 1000 images.*

## *The Examination task card*

The **Examination** task card is used for setting and displaying examination-related operating and program parameters. It is also used for acquiring images and for displaying current examination images and examination data.

### *Layout of the Examination task card*

The task card is displayed on the left monitor, the so-called live monitor:



- (1) Menu bar
- (2) Status bar
- (3) Control area
- (4) Image area

## *Elements of the Examination task card*

### *Menu bar*

The user can access various functions using the menu bar. It opens when the mouse cursor is moved to the upper edge of the monitor.

### *Status bar*

A dark blue rectangular box containing the text "Ready for X-ray." in white.


System messages indicating the current state of the ARCADIS Avantic or error messages are displayed in the lower part of the control area.

### *Control area*

The following data is displayed within the control area:

- ☐ Information about the current patient
- ☐ Examination settings
- ☐ The current state of the ARCADIS Avantic

### *Patient data*

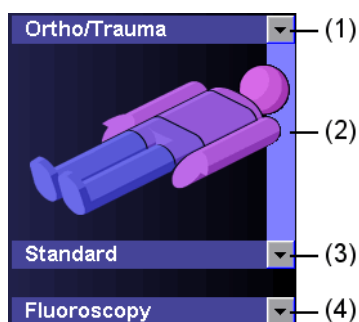
A dark blue rectangular box containing the text "Musterman", "Jose", and "11/18/1858" in white, stacked vertically.

The registered patient's last name, first name, and his/her date of birth appear in the upper control area.



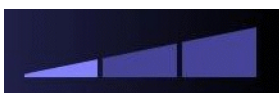
### Selection area for examination settings

The selection area for examination settings offers several selection lists that can be opened by using arrow symbols.

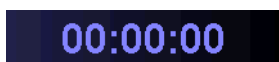


- (1) Selection list medical application areas
- (2) VPA (**V**irtual **P**atient **A**natomy) for selecting the body region
- (3) Selection list examination programs
- (4) Selection list operating modes

### Radiation information



The dose level of the selected examination set is displayed in a progress bar.



The entire fluoroscopic time since the examination of a patient has started is displayed there.



The cumulative area dose product for the current patient is displayed, if the dose measurement chamber option is available.



As an alternative: Display of air kerma values. The cumulated air kerma value is identified by a preceding dot.



*Depending on country-specific regulations, you can have Siemens Service change the display so that it indicates the air kerma and cumulated air kerma value instead of the area dose product.*

## *Tube monitoring*

The X-ray tube load (e.g. tube temperature) is continuously monitored by the system. In the case of excessive load, the system automatically switched to a lower dose. Depending on the load, the dose can be lowered by up to two levels.



The current tube status is shown by a three-segment bar display:

- ☐ The position of the bar indicates whether the tube load is in the normal range, in reduction level 1 or reduction level 2.
- ☐ The length of the bar shows the radiation time remaining to the next reduction level as a percentage.



*The automatic dose level reduction is additionally indicated by an arrow in the bar chart of the dose levels.*

## *Image area*

In the image area the fluoroscopic images are displayed during and after exposure.

### **Live images**

As soon as the exposure (i.e. the radiation) starts, the current fluoroscopic images (live images) are displayed in the image area of the **Examination** task card.

### **Last Image Hold (LIH)**

The last fluoro image (Last Image Hold) is displayed in the **Examination** task card as soon as the exposure is terminated.

## Performing an examination

After you have registered the patient for the examination, the **Examination** task card appears automatically. Here you can check the default examination settings. If necessary, you can change the parameters in the selection area for the examination settings in the control area.

Individual exposures are released directly at the C-arm system with the hand switch or footswitch.



*If you x-ray a patient, without previous registration, this patient has the status of an emergency patient in the local database.*

## Examination settings

In the **Examination** card, standard exposure parameters for **Ortho/Trauma** applications are already preset. If these settings are appropriate for your examination, you can start the acquisition immediately at the ARCADIS Avantic.

Whereas, if you want to optimize the examination settings according to your medical indication, simply call up the required parameters by using the corresponding selection lists.

### How to proceed

The different examination settings are divided into different parameter sets that are structured hierarchically. The sequence of the associated selection fields in the **Examination** task card corresponds exactly to this hierarchy. Therefore, when defining the desired settings, you simply proceed from top to bottom in the control area:

1. Selection of the medical application field
2. Selection of the body region to be examined
3. Selection of the exam set (thereby setting the dose)
4. Selection of the operating mode (thereby loading the parameter settings of the associated operating program)

## *Medical application area*

First select the scheduled medical application area.

General

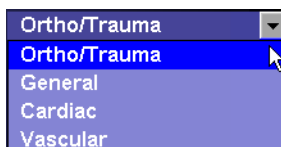


*You can configure which application area is automatically selected after patient registration.*

Each medical application area is assigned a specific standard program. As soon as the application area is activated, you can perform an X-ray examination right away.

### **Selecting the application area**

- ◆ Select the required medical application area for your examination in the selection list.



## *Body region*

If you want to x-ray a specific body region within an application field, several exam sets adapted especially to this special body region are at your disposal. They can be selected using the VPA (**V**irtual **P**atient **A**natomy

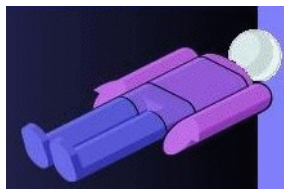
).



*If no body region is selected, the standard program for the selected application area is activated.*

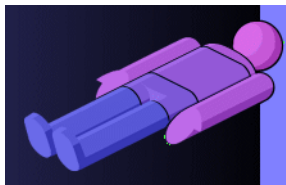
### **Selecting body regions**

- ◆ Click on the body region that you want to examine.
  - The activated body region is highlighted by clear color.



### Deactivating the selected body region

- ◆ Click on another body region that you want to examine.
- or —
- ◆ Click in the area outside of all body regions.
- The deactivated body region is displayed in the original color.



### Exam set

Three different dose programs are available for each selectable body region. These programs are contained in the operating mode settings.

When a body region is selected, the **Standard Dose** program is activated by default:

### Modifying the dose

Usually a dose rate deviating from the standard settings is only reasonable, if you have to adapt the dose to the particular anatomic conditions of the patient (e.g. very slim or obese patients).

- ◆ Use the selection list to select another dose program, if necessary.
- With **Reduced Dose** you set the minimum dose rate which still provides satisfactory image quality for the selected body region.



*If you change the exam set, fluoroscopy mode is automatically set.*

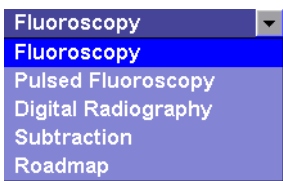
*If a different LUT is stored with the exam set, the display of the current image changes (LIH).*

Operating mode


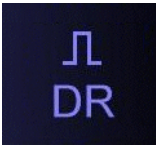



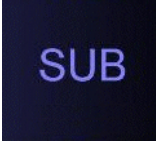
The different operating modes are defined in each examination set. They can be activated at the monitor trolley and at the C-arm system as well as with the (optional) multifunctional footswitch. The default setting is **Fluoroscopy**:



Switch the operating mode



- ◆ Use the selection list to select another operation mode, if necessary.
- or
- ◆ Press the corresponding icon button at the C-arm.  
(→ Register 2: System Description)
- The selected operation mode is displayed in the control area as a symbol.

Default	Symbol	Option	Symbol
Fluoroscopy		Digital radiog-raphy	
Pulsed fluoros-copy		Roadmap	
Digital Cine Mode		Subtraction	



*Using the footswitch, the operating mode can be changed temporarily, depending on the pedal actuated.  
(→ Register 2: System Description)*

*With an additional operating element on the (optional) multifunctional footswitch you can select the operating mode permanently.  
(→ Register 10: Accessories and Options, **page 5**)*

*During the exposure, the **Examination** task card always shows the symbol of the operating mode in which radiation is released. If no radiation is released, you will see the symbol of the operating mode that is currently selected at the control panel of the C-arm system or in the **Examination** task card.*

## Exposure

All further steps of the examination are performed at the C-arm system. For detailed information please read  
(→ Register 2: System Description, **page 9**)

### Releasing radiation

- ◆ Release radiation with the hand or foot switch.
- The current fluoro image is displayed on the left (live) monitor.

### Saving and displaying pictures

#### Saving Images

In Continuous Fluoroscopy and Pulsed Fluoroscopy mode, images can be stored during the examination. Images that you later want to print on a local printer must be saved during the examination.



*Frequent activation of the Save button during fluoroscopy can delay the storage process.*



- ◆ Press this key on the control panel of the C-arm system.

— or —



- ◆ Press this key at the hand switch.
- The current image will be saved in the local database. All images saved in the course of an examination are stored as a series.
- The saved image is displayed on the right (reference) monitor.  
(→ **page 21**)



*If the examination program used is configured in such a way that all images are saved, the **Save Image** key is inactive.*

## Changing the image display

The control panel of the C-arm system provides basic tools for optimizing the image display of the **Examination** task card.



- ◆ Edge enhancement (4 levels).



- ◆ Selection of LUT steps on monitor A.



- ◆ Enlarging/reducing the image.

## Reviewing and storing a scene

In the Continuous Fluoroscopy, Pulsed Fluoroscopy, Subtraction and Roadmap modes, scenes can be reviewed and stored (Last Scene Hold) during the examination.

### Reviewing a scene

As soon as the exposure is finished, buttons for controlling scene review are displayed in the control area of the **Examination** task card.



- ◆ Start.



- ◆ Stop.



- ◆ Previous/next frame.



If **Autoloop** is configured in the exam set used, review of the scene is started automatically at the end of the exposure.



### Storing the scene

- ✓ Scene review has been stopped.
- ◆ Select **Patient > Save LSH Scene** in the main menu.
  - or —
- ◆ Press function key **F9** on the keyboard.
  - The last 120 images are stored in the local database.
  - You can load the scene into the **Viewing** task card at any time and review it there.



*If the exam set used is configured such that all images are saved, manual saving is not necessary and therefore not possible.*

### Playing back a scene (Digital Cine Mode)

Exposures in the DCM operating mode (Digital Cine Mode) can be played back as movie. If you press the relevant keys on the control panel of the C-arm system,- the display on monitor A changes from the **Examination** task card to the **Viewing** task card.



- ◆ Start / Frame forward.



- ◆ Stop / Previous frame.

### *Completing the examination*

After you have completed your exposures, the last acquired image is displayed on the left monitor. Now you finish the examination of the current patient.

If you want to examine the next patient immediately afterwards, you can register that patient straight away. In this case, the examination of the current patient is finished automatically.

#### **Finishing an examination**

- ◆ Select **Patient > End Examination** in the main menu.

— or —

- ◆ Press function key **F4**.
  - The examination is concluded. Patient and examination data are deleted from the **Examination** card.
  - If the MPPS option is installed, the **Modality Performed Procedure Step** window for performance documentation is now automatically displayed.  
(→ Register 3: Patient Data, page 45)

#### **Examining the next patient**

- ◆ Select **Patient > Register** in the main menu and register the next patient for examination.
  - The examination of the previous patient is completed.
  - The data of the new patient are loaded into the **Examination** card.

---

## Special examinations

The following optional operating modes require special procedures deviating from the standard examination:

- ☐ Digital subtraction angiography (SUB)
- ☐ Roadmap

### Digital subtraction angiography (SUB)

During the examination, images without contrast medium (mask) are continuously subtracted digitally from images with contrast medium and displayed on the monitor. Depending on the contrast medium flow, they display the relevant vascular segment without superimposition in real time.

#### Progression

Digital subtraction angiography is divided into three phases:

- ☐ Phase A  
Time until the mask is completed (permanently defined)
- ☐ Phase B1  
Time from the "Inject" display on the monitor until the contrast medium has reached the area to be examined.
- ☐ Phase B2  
Time of the actual exposure of the examination region



If **Autostore** is activated in the configuration menu, you should enter the duration for phase B1 and the storage transfer rate for phases B1 and B2 in that menu. Thus the image memory is not overloaded with unnecessary images.  
(→ Register 7: Configuration, **page 17**)

#### Landmark

In some cases it is useful to see the anatomy surrounding the contrast-filled blood vessels. This can be configured gradually prior to the examination using the **Landmark** function.  
(→ Register 7: Configuration, **page 17**)

## Performing subtraction angiography

✓ Prerequisite: The patient to be examined has been registered.

◆ Make the necessary settings for the examination.  
(→ page 9)



- ◆ Set the **Subtraction** mode in the **Examination** task card or by pressing the corresponding key on the control panel.
  - The symbol for the current operating mode, **Subtraction**, is displayed.
  - The LED of the **SUB** key lights up.
- ◆ Before starting the exposure, click the **Native** tab on the right monitor.
  - The **Native** task card is placed in the foreground.
- ◆ Release radiation with the hand switch or with the assigned footswitch.
  - During the generation of the mask the native image is displayed on the right monitor.



- ◆ Inject the contrast medium as soon as the syringe symbol appears on the screen.



*Keep the radiation release button pressed until the vessel is filled with contrast medium.*

- On the left monitor you can see the continuous filling of the blood vessel with contrast medium.
- After radiation has been switched off, the left monitor shows a subtraction image with accumulated contrast medium (maximum fill image). The right monitor shows the image with the largest fill phase and anatomical background (native).

## Roadmap

In the first step of the Roadmap examination, the max. fill image is created as a mask from a normal subtraction (phase A and phase B). If the Roadmap examination is performed right after a subtraction angiography, you can use the existing subtraction mask, thus eliminating the first step.

In the second step, the display of the vessel into which the catheter is to be positioned is superimposed by current fluoroscopic images (phase C).

### Generating a new fill image

If there is no suitable subtraction mask (e.g. from a previous subtraction angiography), you have to generate a new fill image.

✓ Prerequisite: The patient to be examined has been registered.

◆ Make the necessary settings for the examination.  
(→ page 9)



◆ Set the **Roadmap** mode in the **Examination** task card or by pressing the corresponding key on the control panel.  
– The symbol for the current operating mode, **Roadmap**, is displayed.  
– The LED of the **ROADMAP** key lights up.

◆ Release radiation with the hand switch or with the assigned footswitch.  
– The live image is displayed on the left monitor.



◆ Inject the contrast medium as soon as the syringe symbol appears on the screen.



*Keep the radiation release button pressed until the vessel is filled with contrast medium.*

◆ Let go of the radiation release button.  
– Radiation is stopped.

## Using the fill image from subtraction angiography

- ✓ Prerequisites: A subtraction angiography (**SUB** mode) has been performed. The subtraction image is displayed on the right monitor.
- ✓ The symbol for an existing subtraction mask is shown in the control area.



- ◆ Press the **ROADMAP** key on the control panel *once*.
  - The operating mode is switched to **Roadmap**.
  - Now you can start positioning the catheter.



*If you press the **ROADMAP** key twice, the existing subtraction image is discarded. You will then have to regenerate the fill image.*

## Positioning the catheter

- ◆ Release radiation with the hand switch or with the assigned footswitch.
  - The live image is displayed on the left monitor.
- ◆ Position the guide wire or the catheter under fluoroscopic control.
  - The right monitor shows the fluoroscopic image.
  - The left monitor shows the subtracted Roadmap image with catheter.



*You can repeat fluoroscopy as often as needed while you insert the catheter.*

*When you select **Roadmap** again, start a new Roadmap scene.*

## *References task card*

The imaging system uses two monitors for image display.

- ❑ The left monitor is used to display live images as well as preoperative and postoperative images. It contains the **Examination** and **Viewing** task cards.
- ❑ The right monitor is used to display reference images and contains the **References**, **Native** (for the **Subtraction** option), and **Filming** (option) task cards.

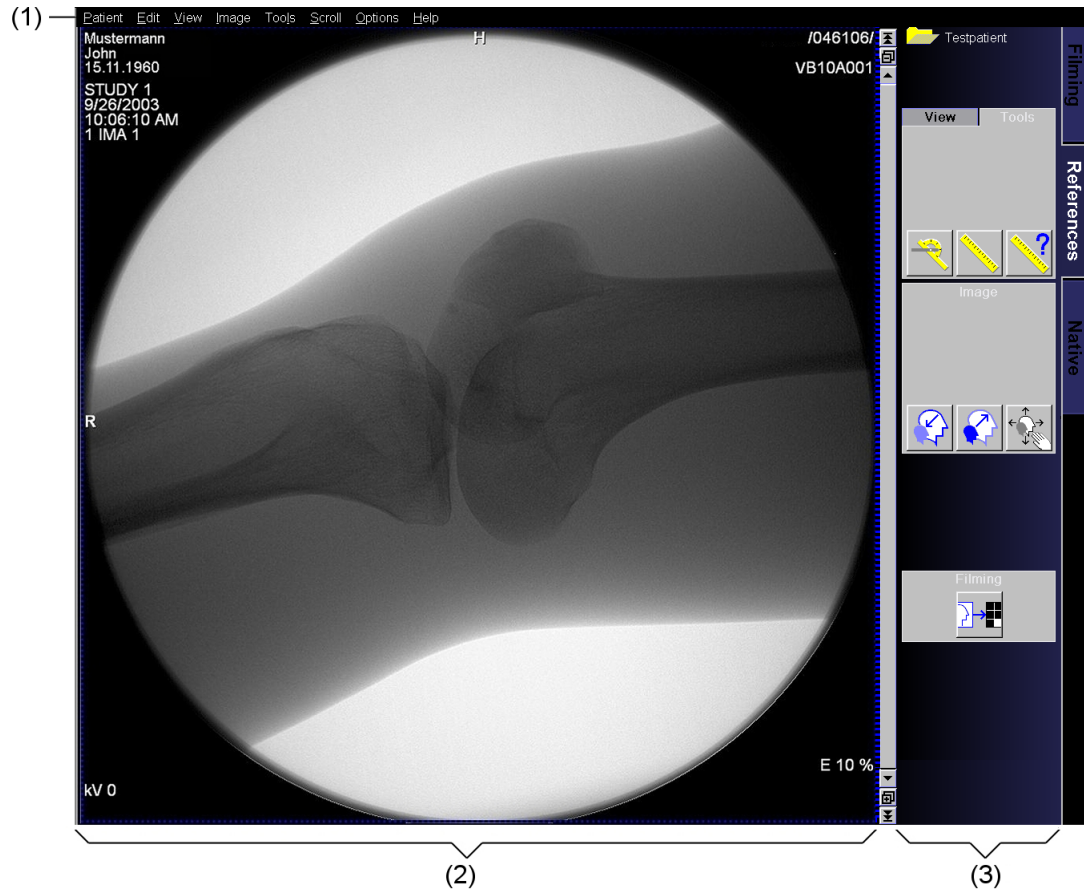
### **Reference images**

The **References** task card is used to display specific images during an examination.

Reference images may be:

- ❑ preoperative images, incl. images of other modalities (e.g. CT, MR)
- ❑ images of current examinations
- ❑ images from previous examinations

## *Layout of the References task card*

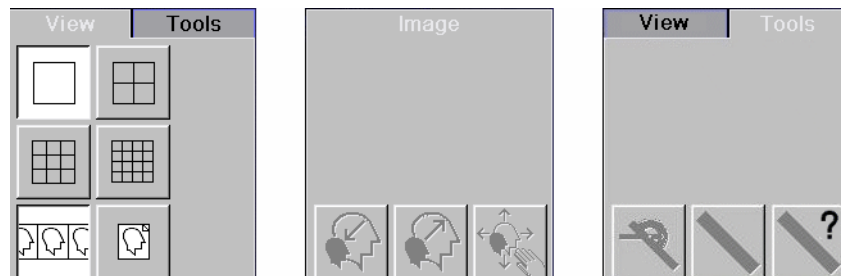


- (1) Menu bar
- (2) Image area
- (3) Control area with subtask cards



## Subtask cards

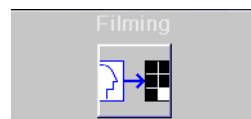
The function of the individual buttons is the same as in the **Viewing** task card.  
For a detailed description on how to use the buttons, please refer to  
(→ Register 5: Viewing, page 5)



Using the **View**, **Image** and **Tools** subtask cards, you can easily change the display of reference images and perform measurements, if necessary.

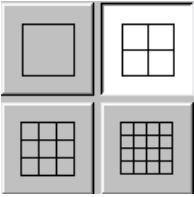




*The **Tools** task card is available, if your ARCADIS Avantic disposes of the “measure angles and distances” option.*






Using the **Filming** subtask card, you can copy the currently displayed image into the **Filming** task card. From there you can send it to a connected printer.




**View subtask card** The **View** subtask card contains buttons for setting the layout.

	Division of the screen (Single view, 4:1, 9:1 and 16:1)
	Image stripe display (stripe)
	Image stack display (stack)

**Image subtask card** On the **Image** subtask card, you will find tools for image processing.

	Reduce image size to half (factor 0.5)
	Zoom in to double image size (factor 2.0)
	Zoom and pan

**Tools subtask card** The **Tools** subtask card contains buttons for image evaluation.

	Angle
	Distance
	Calibration

---

## Displaying reference images

Besides the live images on the left monitor, selected images can be displayed on the right monitor in the **References** task card, e.g. images that you might need for comparisons. You can transfer the relevant images before starting an examination, or you can define suitable live images as reference images during an examination.

As long as you do not perform an examination, you work directly at the monitor trolley in the **Viewing** and **References** task cards.

During an examination you can use the control panel of the C-arm system to control the individual functions of the **References** task card.

## Operation at the monitor trolley

You can load images of completed examinations from the **Patient Browser** into the **Viewing** task card, and then into the **References** task card.

Images from the hospital network (e.g. archive) can also be loaded as reference images using the **Viewing** task card. Thus you have the possibility to display images of other modalities (e.g. MR, CT etc.) on the **References** task card.

## Notes



*Since permanent network functionality cannot always be guaranteed, reference images should be loaded from the network archive before starting an examination.*



*Once a patient has been registered for an examination, only images of the registered patient can be transferred to the **References** task card.*

## Transferring images

### Selecting images

- ◆ Load the images of the required patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select the reference images in the image area.



*You can also select a single frame from a series as reference image (with Subtraction option).*

### Loading the images



- ◆ Click on the icon button of the **References** task card in the control area of the **Viewing** task card.
- or —
- ◆ Call **Patient > Copy To References** in the main menu of the **Viewing** task card.
- The images selected in the **Viewing** task card are loaded into the **References** task card.



*You can use the **View** subtask card in the control area of the **References** task card to change the display of loaded images.*

## Holding the reference image

The **Hold Reference** function allows you to select a particular image and then record it on the right monitor.

- ◆ In the **Options** menu of the **Examination** or **Viewing** task card, select **Hold Reference**.
- The image is recorded on the right monitor. The menu entry is marked with a check mark.



*If you save a new image, it is displayed on the right monitor and the held reference image is hidden. Scroll to the held reference image to show it again.*

- ◆ To deactivate the function, deselect **Hold Reference** in the **Options** menu.

---

## Operation at the C-arm system

During an examination the current live images are displayed in the **Examination** task card.

Select those live images that are suitable as reference images and transfer them to the right monitor in the **References** task card.

### Transferring images

As soon as you save an image, it is displayed on the right monitor in the **References** task card.



*Frequent activation of the Save button during fluoroscopy can delay the storage process. In this case an image other than the one last saved may be displayed. If this happens, manually scroll to the last image.*

### Saving an image



- ◆ Press this key on the control panel of the C-arm system.

or



- ◆ Press this button on the hand switch.
  - The last acquired image is stored and displayed in the **References** task card.
  - If you continue with the examination, the last stored image is always displayed on the right monitor.



*If **Hold Reference** is activated for a particular image, this image will be permanently available on the right monitor.  
(→ page 26)*

## *Using the References task card*

Besides transferring images, you can select other important functions of the **References** task card from the C-arm system.

### **Scrolling**



- ◆ Scrolling to the next reference image.



- ◆ Scrolling to the previous reference image.



### **Changing the image display**

- ◆ Selection of LUT steps on monitor B.



### **Print**

- ◆ Printout of one or several reference image(s) on the local printer.
  - If single frame display is selected, the image displayed on the right monitor is printed.
  - If multiple frame display is selected, the images selected on the reference monitor are printed individually.



*Printing does not take place immediately. Images are first transferred to the **Filming** task card and can be printed out later (provided that **Auto Expose** is deactivated).*

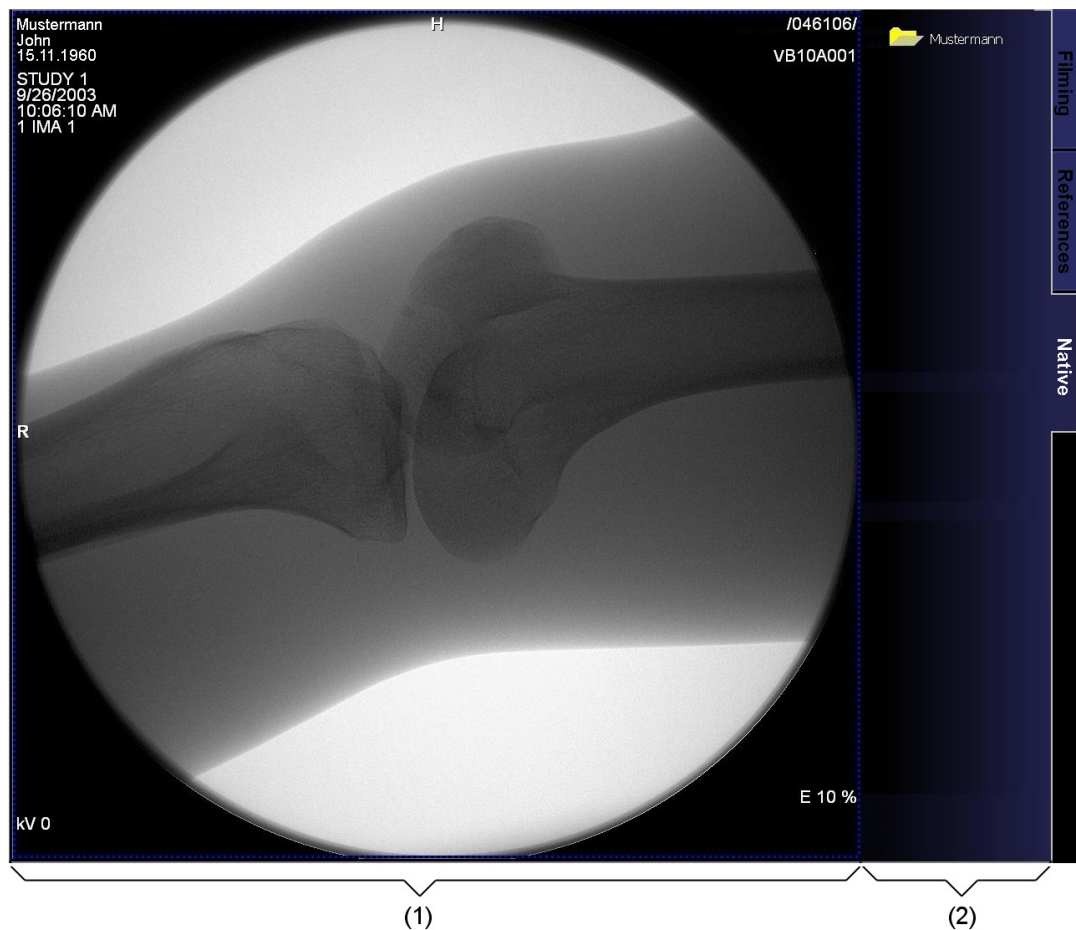
*(→ Register 6: Filming/Printing and Archiving, page 17)*

## Native Task Card

The **Native** task card is available, if your ARCADIS Avantic provides the **Subtraction** operating mode (option).

The **Native** task card allows you to have subtraction images shown on the left monitor and simultaneously displayed as native (unsubtracted) images on the right monitor.

### Layout of the Native task card



- (1) Image area for displaying native images
- (2) Control area with patient folder and status bar

### *Displaying native images*

There are basically two cases in which you use the **Native** card for displaying unsubtracted images:

- ❑ During an examination simultaneously with the display of currently calculated subtraction images in the **Examination** card
- ❑ Outside of examinations, simultaneously with the display of subtraction images from the local database in the **Viewing** task card.

### *Native images during examinations*

If you are working in the **Subtraction** operating mode and want to have the subtracted image shown on the left monitor displayed as a native image on the right monitor at the same time, you must select the **Native** task card before releasing radiation.

#### **Displaying native images**

- ◆ Before starting the exposure, click the **Native** tab on the right monitor.
  - The **Native** task card is placed in the foreground.
- ◆ Start your exposures with the hand switch or the footswitch on the C-arm system.
- Each new exposure is simultaneously displayed as a native image on the right monitor and as a subtraction image on the left monitor.



---

### Saving an image

When an image is saved, it is automatically transferred to the **References** task card. The **Native** task card stays in the foreground.



- ◆ Press this key on the control panel of the C-arm system.
  - The last acquired image is stored.
- ◆ Click the **References** tab.
  - The stored reference image is displayed.
- ◆ Click the **Native** tab.
  - The **Native** task card is placed in the foreground again.
- Each additional exposure is displayed as a native image on the right monitor.

### Deactivating the Native task card

If you want to deactivate the **Native** task card, simply select the **References** task card.

- ◆ Click the **References** tab.
  - The **References** task card is placed in the foreground.

### *Native images from the database*

Native images of previous examinations acquired in the **Subtraction** mode (option) or **Roadmap** mode (option) are stored in the local database or in your archive together with the subtraction images. Both image types can be displayed simultaneously on both monitors.

#### **Loading and displaying images**

- ◆ Load the images of the required patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select **Sub > Sub/Native Display** in the main menu of the **Viewing** task card.

— or —



- ◆ Click this button on the **Sub** subtask card.
- In the **Viewing** task card the subtraction images are displayed on the left monitor.
- In the **Native** task card the corresponding native images are displayed on the right monitor.

#### **Closing the patient**

After finishing your evaluation of patient images, close the folder of this patient. Now you can load images of the next patient.

- ◆ Select **Patient > Close Patient** in the main menu of the **Viewing** task card.
- The images in the **Viewing** and **Native** task cards are unloaded. Both task cards are empty now.

---

## Reports

Certain examination data can be stored as structured reports (SR). ARCADIS Avantic offers the following types of reports:

- ☐ Radiation Summary Report

**Use** The reports serve to document examination and treatment data. They are mostly generated automatically. You can read, edit and print the reports.




**Prerequisite** The reports require the examination of a registered patient.

**Security settings** All processes related to reporting are recorded in the audit trail. This applies to generating, opening and editing reports as well as to printing reports.

**Formats** Reports are saved in two different formats. This allows them to be opened in different applications.

- ☐ Secondary Capture (SC)  
Allows loading into Viewing, for example; PACS compatible
- ☐ Structured Report (SR)  
Allows opening in the Report Editor

**Display in the Patient Browser** Reports are identified in the **Patient Browser** as follows, irrespective of the reporting type:

Symbol	Comment
	Symbol in the navigation area (series level)
	Symbol in the content area (instance level) Format: Secondary Capture (SC)
	Symbol in the content area (instance level) Format: Structured Report (SR)

## Radiation Summary Report

The Radiation Summary Report contains the cumulated values for the number of exposures, examination duration and dose. The generation of this report is a fully automatic process.

The screenshot shows a software window titled "Radiation Summary Report" with a subtitle "POSTPROCESSING REPORT". The window is divided into several sections:

- Top Bar (1):** Contains two small icons for printing and saving.
- Status Section (2):** Located on the right, it includes a vertical label "STATUS" and two dropdown menus: "Completion flag" (set to "complete") and "Verification flag" (set to "unverified").
- Patient and Institution Data (3):** The left side is labeled "PATIENT" and contains fields for Name (Barajas Majaro), First name (Jose), Pat.-ID (05.10.10-09:54:02-DST-1.3.12.2), Date of birth (11/18/1858), Age (147 Years), Sex (male selected, female and other options), Weight (kg), and Height (cm). The right side is labeled "INSTITUTION" and contains fields for Hospital, ZIP City, Street Street No, Country, and Phone: Phone No.
- Radiation Data Section (4):** Located at the bottom, it is labeled "RADIATION DATA" and contains fields for Start of examination (2/15/2006 16:27:51), End of examination (2/15/2006 17:43:38), Total number of exposures (0), Cumulative fluoro time (00:00:00 hh:mm:ss), and Cumulative area dose product (13.8 cGycm2).
- Bottom Buttons:** Includes "OK", "Apply", and "Cancel" buttons.

- (1) Icon buttons (printing a report)
- (2) Generation status  
EXAMINATION REPORT: Treatment in process, report is being generated.  
POSTPROCESSING REPORT: Treatment is finished, the report has been completed and stored and can be postprocessed.
- (3) Work status and verification status
- (4) Content area

## Opening a report

### Opening a report for the current patient

- ◆ Select **Reporting > Open Report** in the **Examination** or **Viewing** task card.

— or —



- ◆ Click the button in the control area (in **Viewing** on the **Reporting** subtask card).

- The report for the current patient is opened.



*If several reports exist for the patient loaded in the **Viewing** task card, a dialog box is displayed in which you select the required report.*

### Opening a report for a different patient

- ◆ Double-click the required report in the content area of the **Patient Browser**.

or

- ◆ Select the report in the **Patient Browser**.



- ◆ Select **Reporting > Open Report** or click the relevant button in the tool bar of the **Patient Browser**.

- The selected report is opened.

## Editing a report

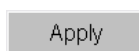
Apart from the work and verification status, no changes are required in the Radiation Summary Report. The other entries can therefore not be edited.

### Setting the status

The status for the postprocessing report is set according to the work progress. A report having the “verified” status can be printed out for documentation purposes.

- ◆ Select the relevant work status/verification status in the selection lists in the status area.

- ◆ Click **Apply**.



### *Printing a report*

You can display a print preview of the completed report or send the report to a connected printer straight away.

#### **Calling up the print preview**

- ◆ Select **Reporting > Print Preview**.

— or —



- ◆ Click this button.

- The print preview of the report is displayed. Here you can scroll through the individual pages and check the entries.

#### **Printing**

- ◆ Select **Reporting > Print**.

— or —



- ◆ Click this button in the report window or in the print preview.

- The **Print Report** dialog box is opened. Here you can make the necessary print settings and start the print job.

---

## Configuration

The generation, printing and exporting of reports is configured in the **Structured Reporting** dialog.

### *Calling up the configuration window*

You call up the configuration window from the syngo **Configuration Panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the **Structured Reporting** button.
  - The **Structured Reporting** dialog is displayed.



Structured  
Reporting

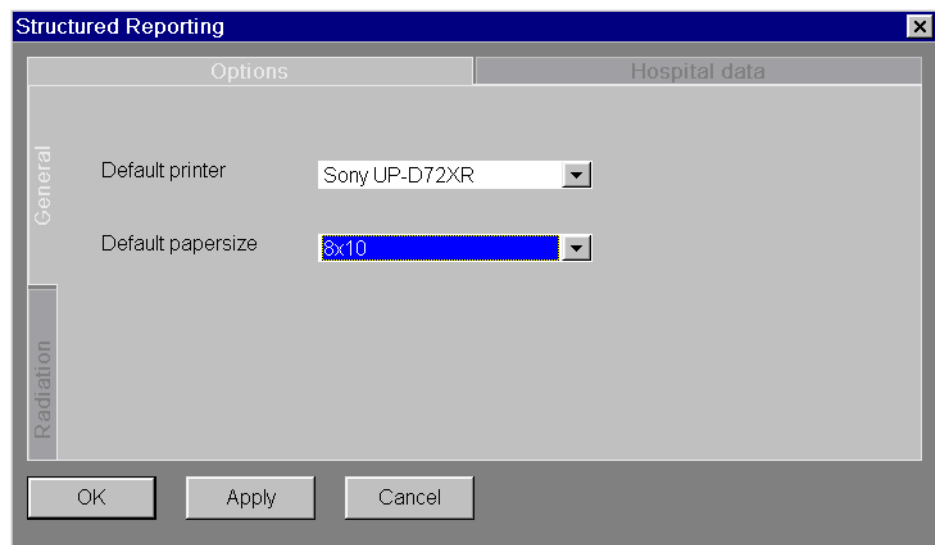
### *Defining print settings*

On the **Options** card, you can define the print settings for the reports.

- ◆ Click the **Options** card into the foreground.
  - The card has two subcards that you can access using the tab at the left-hand edge.

### **Defining default print settings**

- ◆ Click the **General** subcard into the foreground.

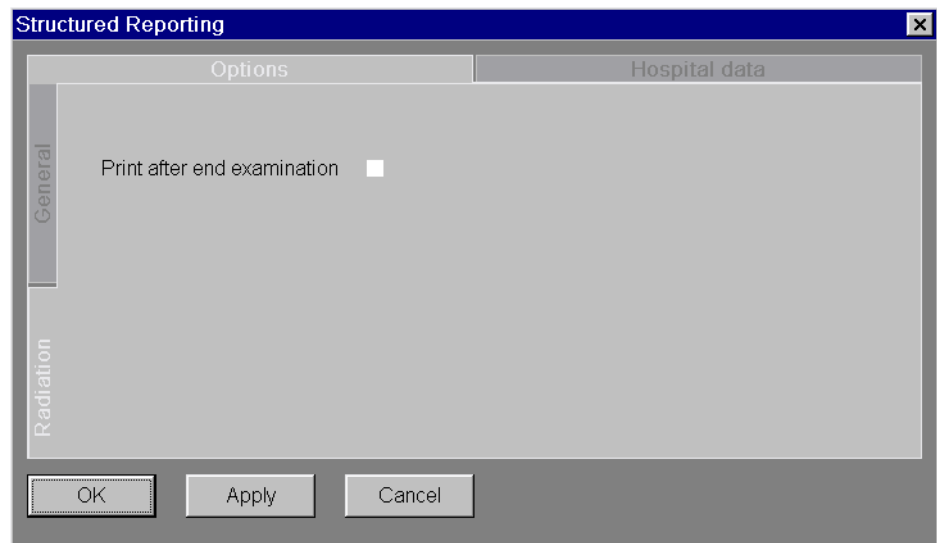


- ◆ Select the required printer from the **Default printer** selection list.
- ◆ Select the required paper size from the **Default papersize** selection list.



**Printing the Radiation Summary Report automatically**

- ◆ Click the **Radiation** subcard into the foreground.

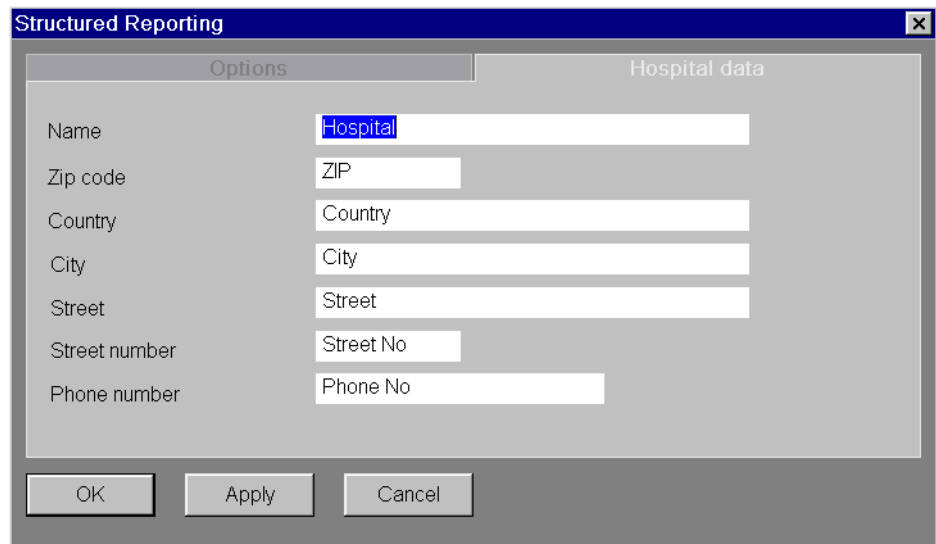


- ◆ Check the check box **Print after end examination**, if you want to print the Radiation Summary Report automatically at the end of the examination.

### *Entering address details*

In the **Hospital data** card you enter the address details of your institution. These data are shown in the report header.

- ◆ Click the **Hospital data** card into the foreground.



The screenshot shows a window titled "Structured Reporting" with a close button (X) in the top right corner. It has two tabs: "Options" and "Hospital data". The "Hospital data" tab is selected. The form contains the following fields:

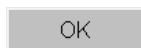
Field Label	Field Value
Name	Hospital
Zip code	ZIP
Country	Country
City	City
Street	Street
Street number	Street No
Phone number	Phone No

At the bottom of the dialog are three buttons: "OK", "Apply", and "Cancel".

- ◆ Enter the address data that you want to appear in the reports.

### *Applying configuration settings*

After you have made all the required settings, you apply them to your system.



- ◆ Click **OK** to apply the settings and to close the dialog box.

or



- ◆ Click **Apply** to apply the settings without closing the dialog box.

# SIEMENS

## Operator Manual ARCADIS Avantic Viewing

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

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## Introduction

On the **Viewing** task card, you can view the results of an examination and evaluate them. You can also compare image material of different examinations and, depending on the configuration, of different patients.

### Loading and displaying images

You can load the images from the **Patient Browser** into the **Viewing** task card. Here you can select one of various ways of arranging the image material and displaying it in the clearest way for your diagnostic problem.

### Processing and evaluating images

On the **Viewing** task card, you can then process and evaluate the images:

- ☐ You can change window values, zoom, pan, rotate, and flip images.
- ☐ You can add comments to relevant image parts.
- ☐ You can measure and evaluate distances and angles in images.

Images that are loaded in the **Viewing** task card can also be loaded in the **References** task card. This also applies for patient images from previous examinations or images that were acquired with other modalities (e.g. MR/CT).

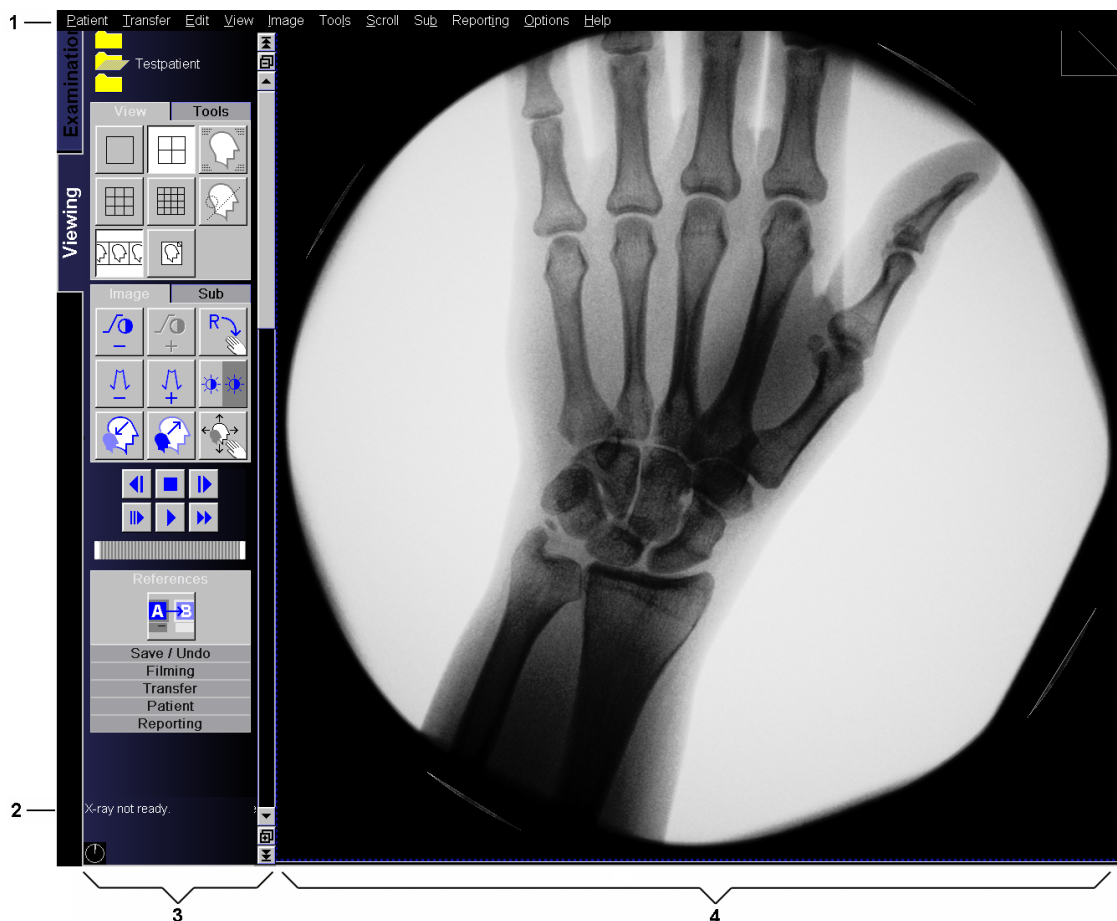
### Storing, filming and transferring images

You can save the images you have processed and evaluated, you can print them or expose them on film or send them to other locations in your hospital.

### *The Viewing task card*

As soon as you have loaded images into the **Viewing** task card, the task card moves into the foreground. You can, however, switch to other applications at any time and resume image processing on the **Viewing** task card later.

The **Viewing** task card is divided into four areas.



- (1) Menu bar with specific entries for viewing and processing images
- (2) Status bar for system messages
- (3) Control area
- (4) Image area



---

## *Image area*

In the image area, the images that you have loaded into the **Viewing** task card are displayed.

### **Display of the image area**

The image area is subdivided into segments. One image is displayed in each segment. Depending on the division of the screen and the number of images loaded, you can only see some of the images. The remaining images are in the background. The last loaded image is displayed in the top left segment.

You can choose between the following layouts:

- ☐ Small format layout  
An overview of many images at the same time is displayed.
- ☐ Large format layout  
Only a few images are displayed on one page in a format large enough to show all details.

### **Image, text and graphic objects**

In the **Viewing** task card, medical images can be supplemented with graphic elements or texts.

## *Control area*

In the control area, you will find all the tools you need to select image material, arrange the screen display and process images.

Here you can also control data exchange with other parts of the program and access other applications.

### **Patient information**

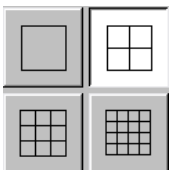
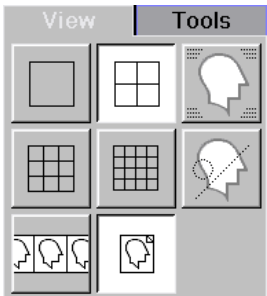


In the upper part of the control area, you can see the names of the patients whose images are currently loaded in the **Viewing** task card. In the **Viewing** task card, you can manage up to three patients.

### **Subtask cards**

The subtask cards contain buttons for accessing editing tools, defining display modes, transferring image data and switching to other applications.

**View subtask card**     The **View** subtask card contains buttons for setting the layout.



Division of the screen (full screen 1:1, 4:1, 9:1 and 16:1)



Image stripe display (stripe)



Series stack display (stack)

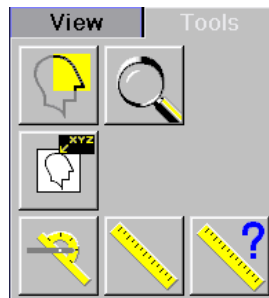


Showing/hiding image text



Showing/hiding graphic elements and comments

**Tools subtask card** The **Tools** subtask card contains buttons for image evaluation and commenting.



Use a shutter



Magic glass



Insert an annotation into the image



Angle (option)

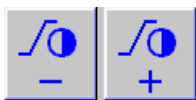
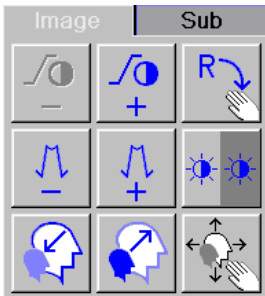


Distance (option)

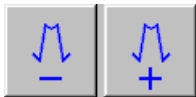


Calibration (option)

**Image subtask card** On the **Image** subtask card, you will find tool buttons for image processing.



Switch brightness/contrast characteristic (LUT) to previous (-) and next (+)



Reduce (-) and increase (+) edge enhancement



Invert gray scales



Reduce an image by factor 0.5



Enlarge an image by factor 2.0



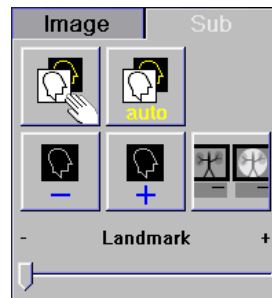
Zoom or pan the image



Rotate the image

**Sub subtask card  
(optional)**

The Sub subtask card is only available with the Subtraction option.



Pixelshift



Auto Pixelshift



Change the mask – and +



Dual Channel Mode (Sub/Native Display)

- ☐ Subtracted image on monitor A (left)
- ☐ Native image on monitor B (right)



Display the anatomical background

**Operating elements  
for filming**

A scene can be played back as a movie.

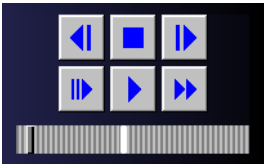
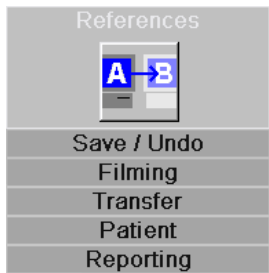


Image viewing elements for filming

**References subtask  
card**



Copy an image into the **References** task card

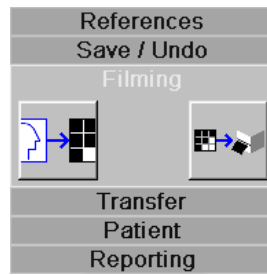
**Save/Undo subtask  
card**



Save as



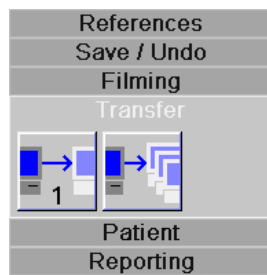
Reset all

**Filming subtask card**

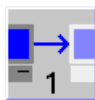
Copy to film sheet



Expose the film/print job

**Transfer subtask card**

Send to (option)

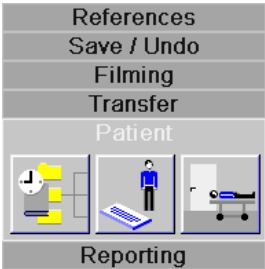


Send to node 1 = standard node (option)



Archive to (option)

**Patient subtask card**



Scheduler

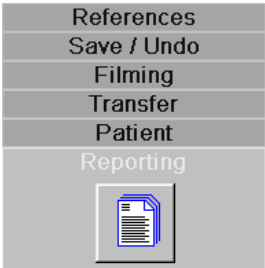


Patient registration



End the examination

**Reporting subtask card**



Open Radiation Summary Report



---

## *Loading and displaying images*

In the **Viewing** task card, you can view and process images that are stored in the main database of your system, and archive them on different media or in a network.

You can access these data via the **Patient Browser**. You can search for patients, studies, series or individual images and load them into the **Viewing** task card.

## *Calling up the Viewing task card*

As soon as you have loaded images into the **Viewing** task card, the task card moves into the foreground. You can, however, switch to other applications at any time and resume image processing on the **Viewing** task card later.



- ◆ Click the **Viewing** tab on the left-hand edge of the screen.
- The **Viewing** task card is placed in the foreground.

## Transferring images from the Patient Browser

You can search for image data that you have stored in the local database or in the archive using the **Patient Browser** and then load it into the **Viewing** task card.

- ◆ Select **Patient > Browser**.
- ◆ Search for the required patient(s), study(s), series or one or more images in the navigation or content area.
- ◆ Double-click the entry or entries that you were looking for.

or



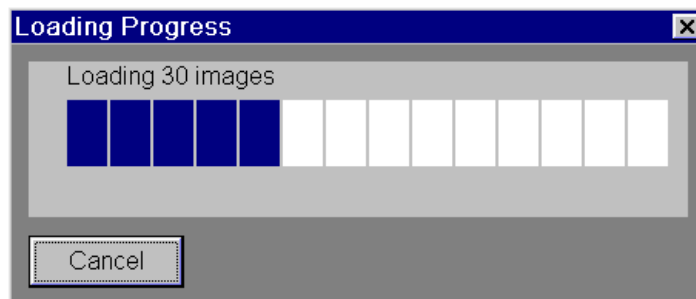
- ◆ Click the **Load To Viewer** button.

or

- ◆ Select **Patient > Load To Viewer**.

or

- ◆ Drag your selection into the **Viewing** task card with the mouse (*drag & drop*).
- The image data are loaded into the **Viewing** task card.
- The progress window **Loading Progress** is displayed.



*If you transfer further images of a patient who is already loaded in the **Viewing** task card, the new images are attached to the existing ones.*

*Images of series or studies that are already in the task card are not loaded a second time.*

*When you load scenes, each scene is displayed as a separate series. If you load a series consisting of several scenes and normal images, each scene and all normal images are loaded as a separate series.*

---

## Displaying images and series

After you have loaded images into the **Viewing** task card, you can choose between different views.

### Selecting image stripe display

Medical images are always displayed in the image area of the **Viewing** task card grouped by studies or series.

Select image stripe display to view the loaded series of a study one after the other image by image.

- ◆ Select **View > Image Stripe**.

or



- ◆ Click the **Image Stripe** button in the **View** subtask card.

- Image stripe display is activated. You see the images of the first loaded series displayed in the image area from top left to bottom right.

### Selecting series stack display

If you want to compare the images of various series of one study, you best select stack display.

- ◆ Select **View > Series Stack**.

or



- ◆ Click the **Series Stack** button on the **View** subtask card.

- All images of a series are now arranged in a stack one on top of the other. You can see the first image of each series.

### *Subdividing the image area*

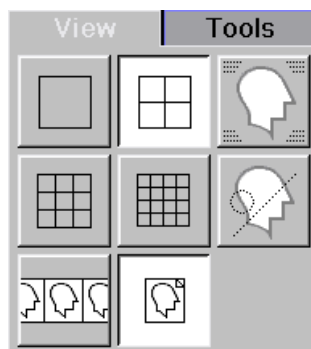
With the division of the image area, you define the number and size of the segments in the image area.

Switch to a large format display with just a few images on the screen if you want to see diagnostic details. Select a small format display with many images to obtain an overview.

- ◆ Select a layout in the **View** menu.

or

- ◆ Select a layout with the buttons on the **View** subtask card.

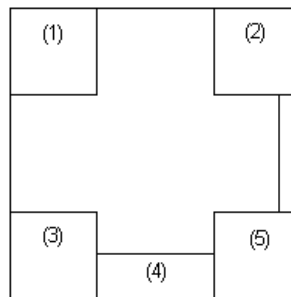


- When you select a new layout, the division of the image area is changed, but the sequence of the images displayed remains the same.

## Showing and hiding image text

Patient and study-specific information and image settings can also be displayed on the image, thus making it easier to identify each image. The image text can also be filmed/printed.

**Text blocks** The information displayed is arranged in blocks around the edge of the image according to its content.



- (1) Patient data
- (2) Hospital / system information
- (3) Acquisition-specific settings
- (4) Image comment
- (5) Window values and edge enhancement

Especially with a small format layout, the images displayed can become cluttered by image text. You can then decide whether you want to have the image text shown in the image or not.

◆ Select **View > Hide Text**.

or

◆ Click the **Hide Text** button on the **View** subtask card.



### *Displaying and hiding graphic elements*

Like text information, you can have graphics (e.g. distance lines) and annotations displayed or hidden.



- ◆ Click the **Hide Graphics** button in the **View** subtask card.

or

- ◆ Select **View > Hide Graphics** in the menu bar.
  - The graphics and annotations are hidden.

---

## Scrolling and selecting images

You will usually have loaded more images and series of a patient into the **Viewing** task card than can be displayed in the image area at once. All those images that cannot be displayed due to lack of space are placed in the background.

### Scrolling

The **Viewing** task card provides you with several alternative ways of scrolling through the loaded images of different patients, studies, or series:

- ☐ **Scroll** menu
- ☐ Scroll bar on the left-hand side of the image area (depending on the configuration)
- ☐ Buttons on the **View** subtask card in the control area (depending on the configuration)
- ☐ Dog ears in the upper right-hand corner of the images (in stack display)
- ☐ Keyboard and symbol keypad

Depending on the processing stage and working method you are accustomed to, you can select your individual way of working.



*In stack display you can scroll through several image stacks simultaneously. When doing this, it may be possible that you reach the end of one or several stacks while in other stacks there are more images left (e.g. if the stacks do not consist of the same number of images). In these cases, black segments are shown in the stacks that are finished as you continue scrolling. The dog ear indicates that the images are in front of or behind the black segments in the stack.*

*If you select several stacks and scroll to the previous or next series, the image stacks are moved accordingly by segments. The image text displayed will help you identify the relevant image stacks. This applies in particular if stacks with black segments have been moved; in this case scroll back to the images first.*

### *Scrolling image by image*

Within a study, you can scroll through the loaded images and series image by image.

#### **Scrolling with image stripe display**

- ◆ Select **Scroll > Image Next** or **Scroll > Image Previous**.

or



- ◆ Scroll with the **image-** or **image+** keys of the symbol keypad.
  - You scroll backward or forward by one image.

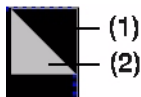


*Explicitly selected images remain selected even if the images are moved into the background.*

#### **Scrolling image by image in a stack**

- ◆ Click on the stack through which you want to scroll with the mouse.
- ◆ Scroll from image to image in a stack with **Image+** or **Image-** just like in image stripe display.

or



- ◆ Click on the outer triangle (1) or on the inner triangle (2).
  - You scroll forward or backward by one image.



*If you want to scroll through a stack of images very quickly, click on the dog ear and hold the mouse button down.*

#### **Scrolling through several stacks image by image**

- ◆ Press the **Ctrl** key and click on the stacks that you want to scroll through. If you click on a stack again, you deselect it.
- ◆ Using the **Scroll** menu, the buttons or the symbol keypad, scroll forward (**Image+**) or backward (**Image-**) through the selected stacks by one image at a time.



*If you have not selected a stack, you only scroll through the stack which is in the input focus.*



---

## Scrolling page by page

A screen page can contain different numbers of segments depending on the layout selected and it may contain only images of one series or images of more than one series depending on the display mode.

You can use the menu, keyboard, or scroll bar to page through the series of a study.

### Scrolling with the menu

- ◆ Select **Scroll > Page Up**.
  - You scroll forward by one page.
- ◆ Select **Scroll > Page Down**.
  - You scroll back by one page.
- ◆ Select **Scroll > Last Page**.
  - You jump to the last page of the current patient folder.
- ◆ Select **Scroll > First Page** to jump back to the first page of the current patient folder.
  - You jump to the first page of the current patient folder.



*The first image of the series is displayed in the top left segment of the image area.*

### Scrolling page by page with the keyboard

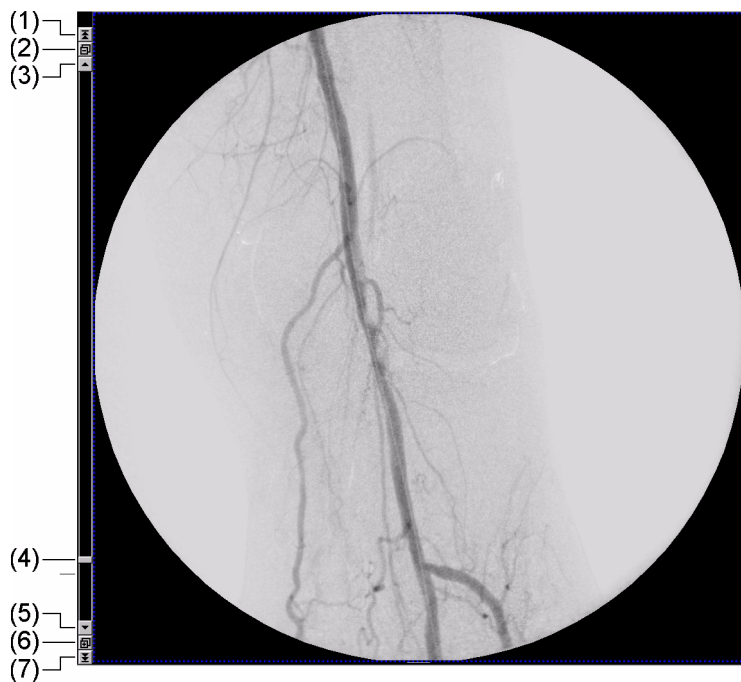
- ◆ Press the **Page Up** key.
  - You scroll forward by one page.
- ◆ Press the **Page Down** key.
  - You scroll backward by one page.
- ◆ Press the **End** key.
  - The last screen page of the study is displayed.
- ◆ Press the **Home** key.
  - You jump to the first page of the study.



*The image area is filled with images. The first image of the series is displayed in the top left-hand corner of the image area.*

### Scrolling with the scroll bar

The third way of scrolling through the images and series of a study is to use the scroll bar.



- (1) Scroll arrow for first page
- (2) Scroll symbol for previous page
- (3) Scroll arrow for previous page
- (4) Slider
- (5) Scroll arrow for next page
- (6) Scroll symbol for next page
- (7) Scroll arrow for last page



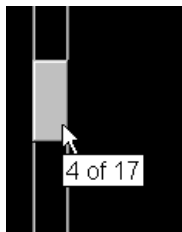
- ◆ Click the scroll arrow for next/previous page.
  - You jump backward/forward by one page/line within the series.



- ◆ Click the scroll arrow for the first/last page.
  - You jump to the corresponding screen page of the loaded series.



- ◆ Click the scroll symbol for the previous/next series.
  - You jump from the beginning/end of the series to the end of the previous series/beginning of the next series (scrolling across series).
  - If you are in the middle of a series, you first jump to the beginning/end of the current series.



- ◆ Drag the slider up or down with the mouse until the page you require is displayed. (The page number is also displayed.)



*If you click the scroll bar above or below the slider, you scroll backward or forward by one page.*

### *Scrolling from series to series*

In addition to scrolling image by image and page by page, you can also scroll by entire series if you have loaded more than one series of a study into the **Viewing** task card.



*It depends on the selected display which images are subsequently displayed in the image area. In image stripe display, for instance, the first image of the series to which you scrolled is displayed in the first image segment. In stack display, the series stacks move to the left or right by one position, and up or down line by line..*

- ◆ Select **Scroll > Series Next** or **Scroll > Series Previous** in the main menu.

or

- ◆ Press the **Series+** or **Series-** key on the symbol keypad.

or

- ◆ Scroll with the image scroll symbols in the scroll bar.



### *Scrolling from study to study*

The image area of the **Viewing** task card contains all the images of the loaded studies and series, provided they all fit on one screen page.

As soon as you have loaded the images, the images of the first study are displayed starting at the top left.

- ◆ Select **Scroll > Study Next** or **Scroll > Study Previous** in the main menu.
  - You page forward or backward by one study.

or

- ◆ Scroll to the next or previous study using the **Study+** or **Study-**key.



---

## Selecting images

On the **Viewing** task card, you cannot only view images, but also process and evaluate them.

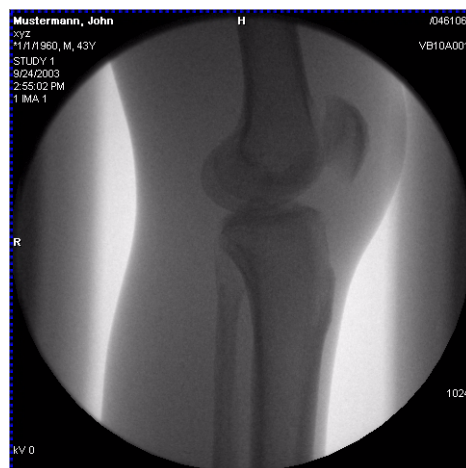
### Selection possibilities

There are two different ways of selecting images for processing:

- ☐ *explicitly* holding the **Ctrl** key down (explicitly selected images are shown with a continuous border)
- ☐ *implicitly* by working in the input focus

### Working in the input focus

The input focus shows the active segment of the image area. It is marked by a dashed border, i.e. it is selected implicitly.



### Default input focus

When you load images into the **Viewing** task card, the input focus is in the default position in the top left segment of the image area.

### Placing the input focus with the mouse

- ◆ Using the left mouse button, click into the segment of the image area on which you want to place the input focus.



*An explicitly selected image or an explicitly selected graphic is deselected if you place the input focus on a segment, even if you only click on the same segment.*

### Changing the input focus using the keyboard

- ◆ Press the arrow key **left** or **right**.
  - The input focus is moved to the next column of the image area.

or

- ◆ Press the arrow key **up** or **down**.
  - The input focus is moved to the next row of the image area.



*If an image or a graphic is selected explicitly, the arrow keys are not active.*

### Processing an image

As long as you have not selected any images explicitly, your processing steps are applied to the image in the segment that has the input focus, i.e. the image with the dashed border.

- ◆ Place the input focus on the image that you want to process.

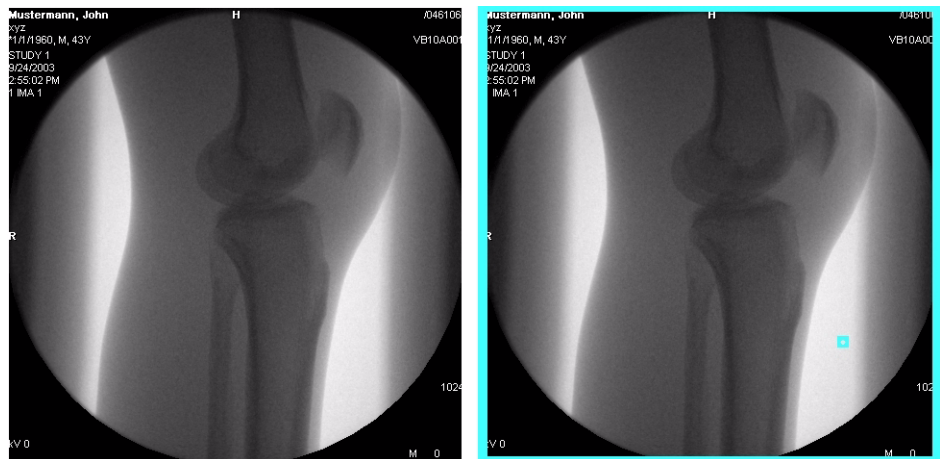


*If you cannot see an input focus in the image area, one or more images are explicitly selected in the background.*

## Selecting images explicitly

Selecting images explicitly means that you select images or series specifically and one after the other. Unlike the input focus, the explicit selection is associated with the content of the segment. Explicitly selected images remain selected even if you move them to the background.

All explicitly selected images have a continuous border.



### Selecting images individually

- ◆ Press the **Ctrl** key and click an image with the left mouse button.
  - The image is selected explicitly.
- ◆ Hold the **Ctrl** key down and click on further images if you want to extend your selection.
  - Several images are selected explicitly one after the other.

### Selecting images explicitly up to the end of series

- ◆ Click on the image that you want to select explicitly holding the **Ctrl** key down, or set the input focus by clicking on the image.
- ◆ Select **Edit > Select On Succeeding** in the main menu.
  - The selected image and all the following images are now selected.



*If you have explicitly selected images of different series, the remaining images of these series are selected starting with those images.*

### Selecting a complete series explicitly

- ◆ First, select an image of the required series explicitly by clicking on it holding the **Ctrl** key down, or place the input focus on the image by clicking on it.
- ◆ Select **Edit > Select Series** in the main menu.
  - The whole series is now selected explicitly.

### Selecting more than one series explicitly

- ◆ Hold the **Ctrl** key down and click on individual images of the required series.
- ◆ Select **Edit > Select Series** in the main menu.
  - Several series are selected completely.

### Deselecting images

If the explicit selection of images does not contain the set of images you require, you can deselect individual images or all images.

- ◆ Place the input focus on an unselected segment manually with the mouse by clicking on it.

or

- ◆ Select **Edit > Deselect All** in the main menu.
  - All selected images are deselected again.



*After that, the standard input focus is set automatically, i.e. the top left segment is active.*



---

## *Selecting direct image processing*

Direct image processing (implicit selection) with the mouse is automatically applied to the image segment on which the mouse cursor is located.

### **Setting the input focus**

- ◆ Place the mouse cursor on an image which is not selected and edit the image, for example, by windowing.
- The input focus is placed on this image.



*If graphics were previously explicitly selected in the input focus, they remain explicitly selected.*

### Viewing images in movie mode

After an examination, you can start movie mode to check the quality of the scenes you just acquired.

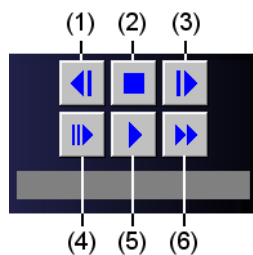


*Movie mode is possible only for scenes generated at the ARCADIS Avantic. You cannot view imported series in movie mode.*



*Movie mode is active only in the **one image per page** layout.*

For movie mode a large image segment is used. The images of a series are played back like a movie.



- (1) Scrolls one image backward
- (2) Stops movie mode
- (3) Scrolls one image forward
- (4) Starts movie mode in slow motion
- (5) Starts movie mode in real time
- (6) Starts movie mode with double speed



*Image text and graphic objects are not displayed during movie replay.*

---

### Scrolling a single image

In the movie segment, you can scroll through all the images of the series.



- ◆ Click on the **Step Backward** button.
  - You scroll backward by one image.



- ◆ Click on the **Step Forward** button.
  - You scroll forward by one image.

### Starting movie mode

In movie mode the images of one series are displayed in a loop. After the last image of the series, the first image is displayed again etc.

You have the following possibilities to optimize movie display and set the speed according to your requirements:

- ☐ slowly
- ☐ real time
- ☐ fast



- ◆ Select **Scroll > Realtime Movie** or click the button.
  - The film is started with the original frame rate.

or



- ◆ Select **Scroll > Half Speed Movie** or click the button.
  - The movie is started with half frame rate.

or



- ◆ Select **Scroll > Double Speed Movie** or click the button.
  - The movie is started with double the frame rate.



*The playback speed can be reduced by postprocessing activities, edge enhancement or subtraction.*

### Stopping movie mode



- ◆ Select **Scroll > Pause Movie** or click the button.
  - The movie is stopped.
  - If you continue playback of the movie, it will start from the beginning again.



*There is no indication, where the film was stopped.*

### Storing the scene

Scenes of a current examination that have not yet been saved can be stored using the Last Scene Hold function.

- ✓ Scene review has been stopped.
- ◆ Select **Patient > Save LSH Scene** in the main menu.
  - or —
- ◆ Press function key **F9** on the keyboard.
  - The last 120 images are stored in the local database.

---

## Editing images

As soon as you have loaded all the series and/or images that you want to view and process into the **Viewing** task card, you can change the display parameters of individual images. In this way, you can emphasize areas and image contents for subsequent evaluation or reporting.

You can adapt the window values of the loaded images. You can enlarge segments and display regions of interest in the center of the screen. You can also rotate, flip or invert images for certain diagnostic problems.



*Extreme window values can impair image quality.*



*With scenes, the image processing functions are applied to all images of a series.*

## Windowing images

Imaging methods provide information in the form of gray scale images with up to several thousand different gray scale values. Windowing means to emphasize the range of gray scales of the relevant area and tissue type.

The first step in windowing therefore consists in determining the window center, i.e. the gray value of the tissue type that is central to your diagnostic problem. The smaller the window center, the brighter the image.

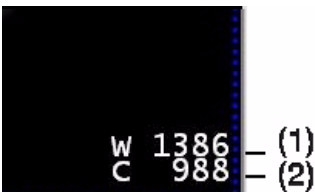
With the window width, you define how many gray scale values above and below the center value you want to see. The smaller the window width, the higher the contrast.



*Windowing of imported color images is not possible.*

### Displaying window values

You can see the window values set in the bottom right-hand corner of the images.



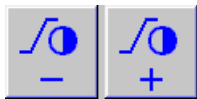
- (1) W: Window width – Contrast
- (2) C: Window center – Brightness

## Assigning fixed window settings (LUTs)

Some imaging methods allow you to display images with alternative window settings using LUTs (lookup tables).

The currently selected LUT is displayed at the bottom right of the image (with display of window values).

- ◆ Select the images that are to be assigned a different LUT.
- ◆ Click the **LUT Previous-** or **LUT Next+** button on the **Image** subtask card.



---

## Windowing using the mouse

You can assign new window values to images using the mouse.



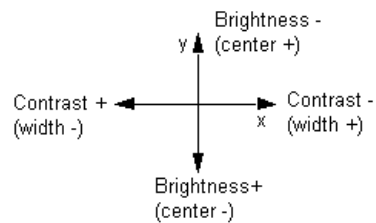
*Pay attention to the scope.*

- ◆ Click on an image segment with the center mouse button and move the mouse holding the button down.
  - The mouse cursor disappears.
- ◆ Drag the mouse up or down.
  - The window center (brightness) is changed.

or

- ◆ Move the mouse right/left.
  - The window width (contrast) is changed.

–



- As soon as you release the mouse button, the new window values are also applied to all the other selected images or the selected scope of action.



*The changed window values are displayed immediately in the image (interactive windowing).*

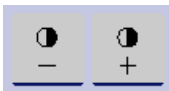
### *Windowing with the keyboard*

For fine adjustment of the window values, you can also use the keys on the symbol keypad of the keyboard.



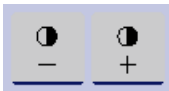
*Pay attention to the current scope.*

#### **Setting the contrast**



- ◆ Press the **Width-** or **Width+** button.
  - The contrast is reduced or increased in small steps.

or



- ◆ Keep the **Width-** or **Width+** button pressed.
  - The contrast is reduced or increased in larger steps.

#### **Setting the brightness**



- ◆ Press the **Center-** or **Center+** button.
  - The contrast is reduced or increased in small steps.

or



- ◆ Keep the **Center-** or **Center+** button pressed.
  - The brightness is reduced or increased in larger steps.

### *Restoring window values*

- ◆ Select **Image > Reset Window**.
  - The selected image(s) is/are displayed with their original window values.



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## Edge enhancement

Blurred images, or images with a high noise level, can be postprocessed with a filter. Edge enhancement is an adaptive filter that emphasizes existing structures (edges) in the image.



*The enhancement factor can be set within a range of 0% to 100% in 10% increments.*



- ◆ Select one or more images or series.
- ◆ Click the **Edge Filter Next** button on the **Image** subtask card.

or

- ◆ Select **Image > Edge Filter Next**.
  - The image is displayed with enhanced structures.



*The higher the filter setting, the more structures are enhanced and the less they are smoothed.*



- ◆ Click the **Edge Filter Previous** button on the **Image** subtask card.
- or
- ◆ Select **Image > Edge Filter Previous**.
    - The image is displayed with less enhanced structures.

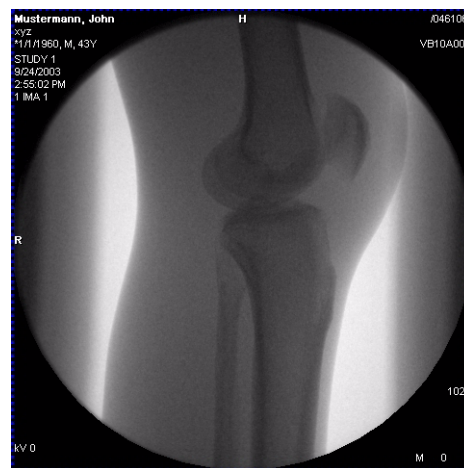
### *Zooming and panning images*

Sections of images that are of particular interest to you can be zoomed in, i.e. enlarged. If the enlarged image then no longer fits in the segment, you can pan it until the relevant area is in the center of the segment again.

### *Zooming images*

The **Viewing** task card provides you with several possibilities of enlarging or reducing images.

### **Displaying images in double size / half size**



- ◆ Select the images that you want to edit.



- ◆ Click the **Zoom Out By 0.5** button.
  - The zoom factor of an image is halved.



OR



- ◆ Click the **Zoom In By 2.0** button.
  - The zoom factor of an image is doubled.



### Zooming with the mouse

The left mouse key is used to select or deselect images and objects. However, you can also switch over the function of the left mouse button to zoom and pan images.

- ◆ Select **Image > Zoom/Pan**.

or



- ◆ Click the **Zoom/Pan** button on the **Image** subtask card.



- ◆ Now place the mouse cursor close to the edge of an image.
  - The mouse cursor changes shape.
- ◆ Drag the mouse cursor up with the left mouse button pressed.
  - The image is enlarged.

or

- ◆ Drag the mouse cursor down with the left mouse button pressed.
  - The image is reduced.
- As soon as you release the mouse button, the new zoom factor is applied to all the selected images or the selected scope of action.



*When zooming, make sure you do not accidentally click on a graphic element. Otherwise, you would pan the graphic element and not the content of the image.*

- ◆ Deselect **Image > Zoom/Pan** again.

or

- ◆ Click the relevant button again.
  - The left mouse button available for selecting images again.

---

## Panning images

After you have zoomed images, parts of the images might extend beyond the edge of the image segments. Therefore, before saving an image, always pan the image so that the region of diagnostic interest is in the center of the segment again.

- ◆ Select **Image > Zoom/Pan**.

or



- ◆ Click the **Zoom/Pan** button on the **Image** subtask card.

- The function of the left mouse button is now switched from Select to Zoom/Pan.



- ◆ Now place the mouse cursor in the center part of the image.
- ◆ Keeping the left mouse button pressed, drag the mouse up, down, to the right or left to pan the image as required.
- You can immediately see the result of your mouse movements in the image on which the mouse cursor is located.



*When panning, make sure you do not accidentally click on a graphic element. Otherwise, you would pan the graphic element and not the content of the image.*

## Restoring image display

- ◆ Select **Image > Reset Zoom & Pan**.

- The original size with which the images were last stored in the database is restored.

### *Enlarging an image section*

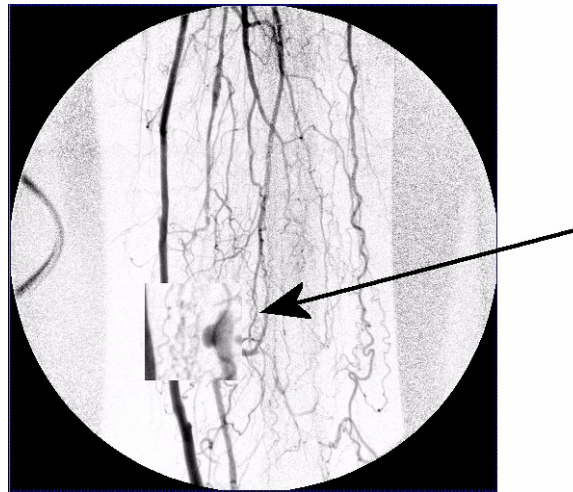
Instead of zooming an image and then panning it so that the relevant section is in the center of the screen again, you can also quickly select specific image sections and display them in a segment in maximum size.

- ◆ Select the image in which you want to display an enlarged image section.
- ◆ Select **Tools > Magic Glass**.

or



- ◆ Click the **Magic Glass** (Zoom) button on the **Tools** subtask card.
- ◆ Click on the selected image with the left mouse button.
  - A rectangular image is displayed with zoom factor 2.0. In this window the enlarged area of the image around the position of the mouse key is displayed.



- ◆ Move the mouse key in the segment.
  - The content of the magnify window is automatically updated.

### **Switching off the zoom function**

- ◆ Select **Tools > Magic Glass** again.

or

- ◆ Click the **Magic Glass** (Zoom) button on the **Tools** subtask card.
  - The magnify windows are deleted from all segments. The original size with which the images were last stored in the database is restored.

## Inverting images

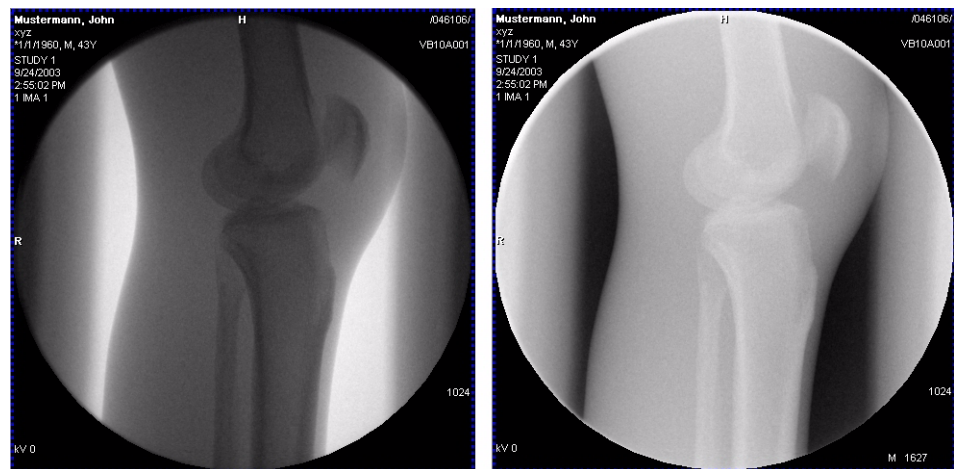
When an image is inverted, bright areas are displayed dark and dark areas are displayed bright. The gray scale assignment in the LUT (lookup table) is inverted.

- ◆ Select the images that you want to edit.
- ◆ Select **Image > Invert Gray Scale**.

or



- ◆ Click the **Invert Gray Scale** button on the **Image** subtask card.



*To reset the original view, select **Image > Invert Gray Scale** again.*

### *Rotating images*

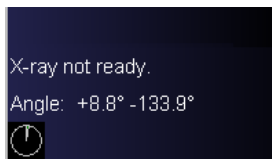
- ◆ Click on the image that you want to edit.

- ◆ Select **Image > Rotate**.

— or —



- ◆ Click the **Rotate** button on the **Image** subtask card.
  - The shape of the mouse cursor indicates that you can rotate the image freely to the left or to the right.



- ◆ Place the mouse cursor at the edge of the image and rotate the image to the required position by using the mouse.
- As long as you keep the left mouse key pressed, the rotation angles are displayed in the lower control area. The first angle indicates by how many degrees the image had already been rotated with reference to the original image. The second angle indicates the current rotation.

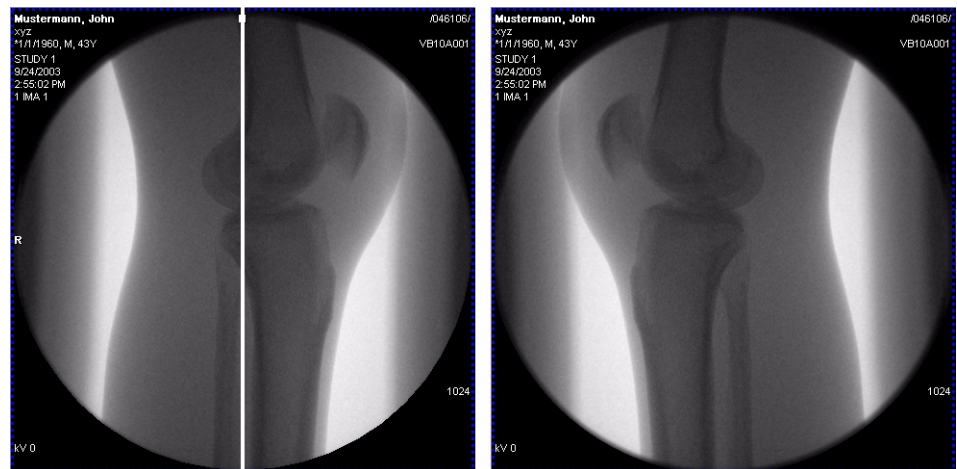


## Flipping images

The Flip function allows you to easily compare images of series that were acquired in a different patient position or direction of examination.

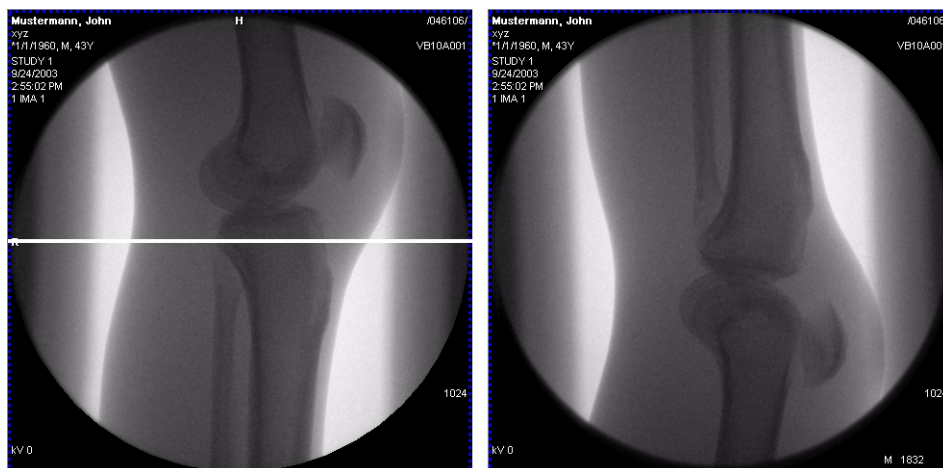
### Flipping images vertically

- ◆ Select the images that you want to edit.
- ◆ Select **Image > Flip Vertically**.



### Flipping images horizontally

- ◆ Select the images that you want to edit.
- ◆ Select **Image > Flip Horizontally**.



## 2D Evaluation (option)

The **Viewing** task card provides you with tools for measuring distances, lengths and angles.

Using a shutter, you can limit the region of interest to the necessary detail, excluding all irrelevant areas.

You can annotate images with image texts in order to document your evaluation.

## Calibration

If you perform evaluations with distance measurements, you must calibrate the image.



*When calibrating, measuring and interpreting values, please note that the acquired images are only a two-dimensional display of three-dimensional objects.*

### Performing calibration

A calibration object with known measurements (e.g. length, diameter, ...) is necessary to define the longitudinal scale.



*The calibration object must be perpendicular to the central beam and within the area of the structure you intend to measure (typically in the center of the measuring field to avoid l.l. distortions).*

- ◆ Select the required image.
- ◆ Select **Tools > Calibration**.

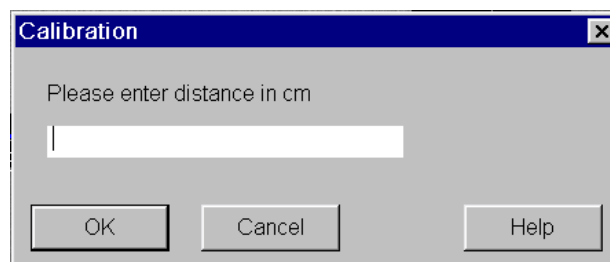
— or —

- ◆ Click the **Calibration** button of the **Tools** subtask card.



### Drawing a distance line

- ◆ Move the mouse cursor into the image.
  - The mouse pointer changes shape.
- ◆ Click on the image to set the starting point and drag a line to the vertex by using the mouse.
  - As soon as you move the mouse, the line is displayed.
- ◆ Release the mouse button to finish the line.
  - The distance line is displayed.
  - The **Calibration** dialog box is displayed.



- ◆ Enter the distance (in cm).
- ◆ Confirm by clicking **OK**.
  - Distance calibration is performed and the calibration factor is displayed in the image.
  - Distances already drawn in the image are updated.

### Canceling calibration

- ◆ Click **Cancel**.
  - The previous calibration factor is maintained.

### Deleting the distance line

- ◆ Select **Edit > Remove Calibration**.
  - The existing distance line is deleted.
  - Instead of the current length, "??" is displayed in all measurement graphics.

---

## Measuring distances and angles

You can measure and evaluate distances and angles in images, if the 2D Measurement option is available.

### Drawing a distance line, measuring the distance

Using a distance line, you can measure the distance between two points in an image.



*When measuring distances near the edge of the image, take into account that the I.I. distortion will result in measurement errors. These depend on the I.I. format. With full format the error of measurement is comparatively large whereas it is considerably smaller with an increasing zoom factor.*

#### Drawing a distance line

- ◆ Select **Tools > Distance**.

— or —



- ◆ Click the **Distance** button of the **Tools** subtask card.
  - The mouse pointer changes shape.
- ◆ Place the mouse cursor on the starting point of the distance line.
- ◆ Hold the left mouse button down and drag out a line.
- ◆ Release the mouse button to finish the line.

### *Measuring an angle*

You can define an angle by two lines, the legs of the angle, that you draw on the image. The system then calculates the angle between the two lines drawn in clockwise. If the angle is larger than 180°, the program subtracts 180°.

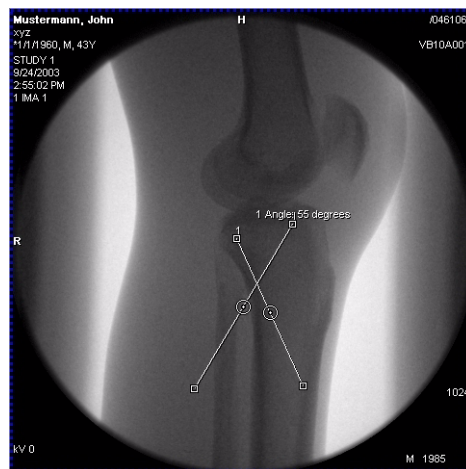
#### **Drawing an angle**

- ◆ Select **Tools > Angle**.

— or —



- ◆ Click the **Angle** button on the **Tools** subtask card.
- ◆ Place the mouse cursor on a starting point for the first leg.
  - The mouse cursor changes shape.
- ◆ Drag a line to the end point of the first leg holding the left mouse button pressed.
- ◆ Draw the second leg in the same way.
  - The two legs of an angle are assigned the same number so you can distinguish several angles unambiguously.



*As soon as you start drawing the second leg, the angle is calculated and displayed.*

*The two lines between which you want to measure an angle do not have to intersect in the image. The program automatically calculates the point of intersection, even if you have not drawn it or if it is beyond the edge of the image.*

### Changing the angle

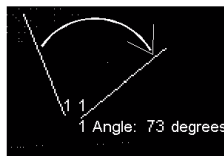
You can change the legs of an angle independently.

- ◆ Move the mouse cursor into the image.
  - The shape of the mouse cursor changes at the positions where you can change a leg of the angle.
- ◆ Move the entire line or drag an end point to another location.

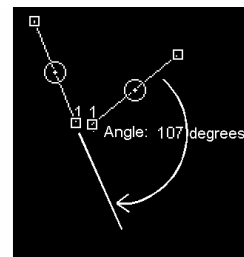
### Switching the angle direction

You can also have the complementary angle displayed (difference of  $180^\circ$  - angle measured).

- ◆ Select the angle.
- ◆ Select **Other Angle** from the context menu (right mouse button).
  - The angle is now measured counterclockwise and the new value is displayed.



(1)



(2)

(1) Angle between the legs

(2) Complementary angle



*If the angle approximates to  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ , it is not clear whether the angle between the legs or the supplementary angle has been entered.*

*Therefore, annotate the angle when you display the supplementary angle.*

### Setting a shutter

You can hide irrelevant areas of the image. To do that, you place a shutter over the image.

After that, only the area within the shutter is displayed and all the surrounding areas appear black.



*Only one shutter can be set in an image or multiframe image. When setting different shutters in different frames of a multiframe image, the shutter in the first frame is taken into account.*

#### Setting a shutter

- ◆ Select **Tools > Shutter**.

— or —



- ◆ Click the **Shutter** button on the **Tools** subtask card.



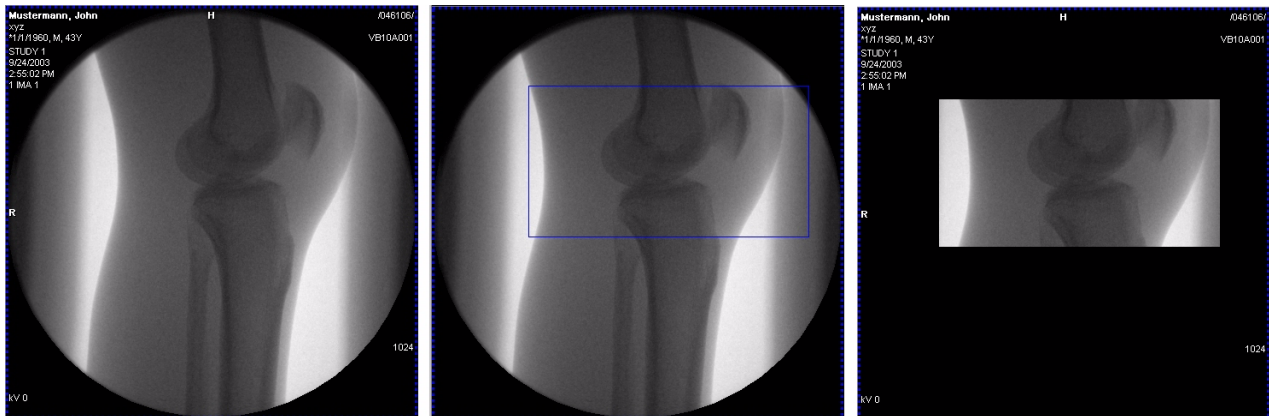
- ◆ Place the mouse cursor in the area of the image that you want displayed.
  - The mouse cursor changes shape.
- ◆ Hold the left mouse button pressed and drag out a rectangle for the shutter.



*By clicking on the border of the image you can select a shutter which you can then move or resize.*



- ◆ Release the mouse button.
- The area outside the shutter is displayed black.



### Removing the shutter

- ◆ Click on the border of the shutter.
  - The shutter is selected.
- ◆ Press the **Del** key on your keyboard.
  - The image is displayed in its original size again.



*Images of a scene always have the same shutter. If they are moved or resized, that change is applied to all images.*

### *Text in images*

You can annotate interesting or anomalous areas in an image.

Some modalities also allow you to store comments with an acquisition series. These comment texts are also displayed in the images and can be altered.

### *Annotating images*

You can anchor image text with a special image detail.

---

#### **CAUTION**

As opposed to image comments, modifications in medical images are not saved automatically. In case of a user switch where the new user does not have adequate access rights, modifications of the image text may also be lost.

#### **Image modifications may be lost!**

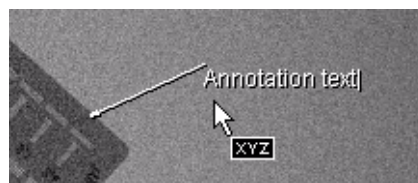
- ◆ Select **Patient > Save...** in order to save the image comment and **Patient > Save as...** to save the image with modifications as a new image.

- 
- ◆ Select **Tools > Annotation Arrow**.

— or —



- ◆ Click the **Annotation Arrow** button on the **Tools** subtask card.
  - The mouse cursor changes shape.
- ◆ Click into the image where you want to place the annotation and draw an arrow, keeping the left mouse button pressed.
  - The text cursor is at the end of the arrow.



- 
- ◆ Enter the desired text.
  - ◆ Confirm your text entry with the **Enter** key.
  - or —
  - ◆ Click into the image outside the text.
  - The text is displayed white with shading.

### Using predefined text

Frequently used texts can simply be selected from a list once they have been configured.  
(→ page 73)

- ◆ Select **Tools > Annotation Arrow**.
- ◆ Using the right mouse button, click on the position in the image where you want to insert the text.
  - A selection list with predefined texts is displayed.
- ◆ Select an entry from the list by clicking it once. If necessary, use the scroll bar to display further texts.
- The text appears immediately.

### Positioning text

Entered texts can be moved freely.

- ◆ Click on the text with the left mouse button.
  - The text is marked by small squares.
- ◆ Drag the text to the new position.

### Editing text

Previously entered image annotations can be changed at any time.

- ◆ Double-click on the text with the left mouse button.
  - The text is marked by small squares. The text cursor is at the beginning of the text.
- ◆ Now change or add to your text.
- ◆ You can finish text editing by clicking into the image outside the text frame or by pressing the **Enter** key.

### Deleting text

Texts can be deleted individually or together with other graphic elements.

- ◆ Select one or several (**Ctrl** key) text elements.
- ◆ Press the **Del** key.
  - The selected texts are deleted.

## DSA Evaluation

Unlike bones for example, vessels do not show a considerably greater absorption of X-rays compared to the surrounding tissue. In X-ray exposures vessels are not especially highlighted.

When subtraction (DSA) is performed, two X-ray exposures are acquired of the region of interest, one with contrast medium and one without contrast medium. Afterwards both exposures are subtracted.

In the subtraction image, areas with the same attenuation and areas with a (slightly) different attenuation, e.g. vessels that were filled with contrast medium during the exposure, can be discerned clearly.

When the DSA option is installed, the following functions are available to optimize subtraction images.

- ☐ Anatomical background
- ☐ Pixelshift

## Loading and displaying images

Native images of previous examinations acquired in the Subtraction mode (option) or Roadmap mode (option) are stored in the local database or in your archive together with the subtraction images. Both image types can be displayed simultaneously on both monitors.

- ◆ Load the images of the required patient into the **Viewing** task card by using the **Patient Browser**.
- ◆ Select **SUB > Sub/Native Display** in the main menu of the **Viewing** task card.

— or —



- ◆ Click this button in the **SUB** subtask card.
  - In the **Viewing** task card the subtraction images are displayed on the left monitor.
  - In the **Native** task card the corresponding native images are displayed on the right monitor.

### Selecting another mask

You can select an image without contrast medium (mask), that you want to subtract from a stack of imgs acquired with contrast medium. To do this, scroll simultaneously through the stacks of subtraction images.

#### Selecting the next mask

- ◆ Select **SUB > Mask Next** in the main menu of the **Viewing** task card.

— or —



- ◆ Click this button.
- The next mask is selected.

#### Selecting the previous mask

- ◆ Select **SUB > Mask Previous** in the main menu of the **Viewing** task card.

— or —



- ◆ Click this button.
- The previous mask is selected.

### Adding the anatomical background

Normally the anatomical surroundings of vessels of interest are not visible in images that are displayed subtracted. By adding the mask image, the surrounding tissue can be highlighted more or less. The initial degree of admixture is defined in the examination set. This value can be modified.

- ◆ Select the required image.
- ◆ Using the mouse, drag the slider to the required position.



*You can set the anatomical background between 0% and 30%.*

- The selected image is displayed with anatomical background.

## Achieving exact covering of image and mask

During acquisition of the subtraction series, the patient or the C-arm system may move. The images that are to be subtracted may not be congruent. The anatomical background, especially in the area of image contrasts, is thus not canceled out.

Exact covering of image and mask (= image without contrast medium) can be achieved if you shift the mask by single pixels.

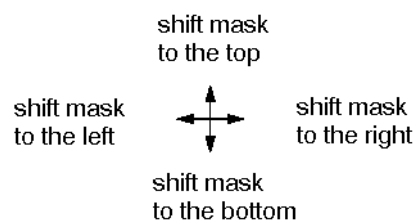
There are two possibilities for pixelshift:

- ☐ Manual pixelshift
  - Shift the mask manually until the best result is achieved.
- ☐ Automatic pixelshift
  - Define an area (ROI) for which pixelshift is to be optimized. The ROI can be defined in one image or in a series of images in a stack. The best result is automatically calculated for this area.

### Manual pixelshift



- ◆ Click this button.
  - The button is displayed selected.
  - The mouse pointer changes shape (arrow).
- ◆ Move the mouse cursor in the image keeping the left mouse button pressed down.
  - The mask is shifted simultaneously (by small amounts).



*To shift the mask in big steps, move the mouse pointer at the edge of the image.  
For fine mask shifting, move the mouse pointer in the center of the image.*



- ◆ Click this button again.
  - The pixelshift function is switched off. The button is displayed deselected.



### **Automatic pixelshift**

- ◆ Click this button.
  - The button is displayed selected.
  - The mouse cursor changes into a rectangle.
- ◆ Move the rectangle to the position in the image where misalignment is most evident.
- ◆ Click this position in the image.
  - The mask is moved so that subtraction for the area within the rectangle is optimized.



## *Saving, transferring, documenting, closing images*

After image processing, when all the images have been displayed in an optimum way and have been evaluated, you can save and archive these images or transfer them to the Filming task card for further evaluation and documentation.

After that, you can close the images of this patient and make space in the **Viewing** task card for the images of the next patient.

### *Saving images*

After you have completed processing and evaluation of the images, you save your results.

You can save your images in one of two ways:

- ☐ You can save the processed images in a new series, or
- ☐ you can add the images to an existing series.



*Note that the newly saved data may not immediately be shown in the **Patient Browser**. The display should first be updated manually, in particular after comprehensive storage processes (select **View > Update** in the **Patient Browser**).*

#### **Calling up the Save As dialog box**

Only images of the same study can be saved together in one series.

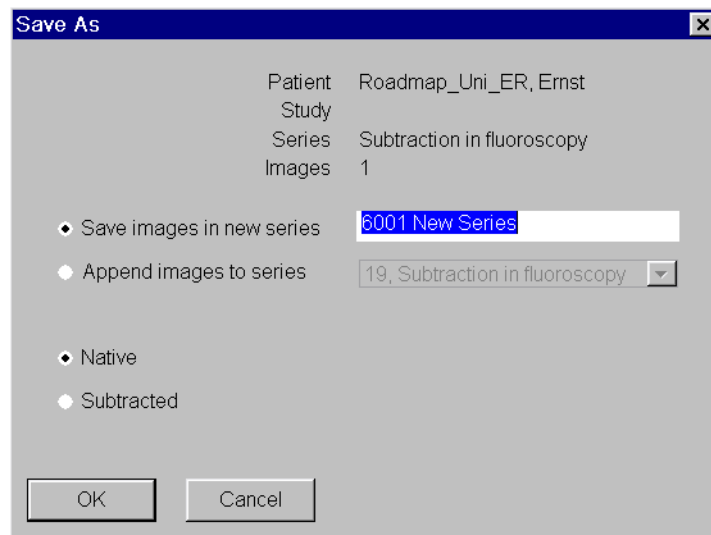
- ◆ First select the images or series that you want to save.
- ◆ Select **Patient > Save as**.

— or —



- ◆ Click the **Save as** button in the **Save/Undo** subtask card.

- The **Save As** dialog box is displayed.



### **Saving images as a new series**

You can save all selected images in a new series. The old series remains unchanged. You can then easily compare processed and evaluated images with the original images of the study.

- ◆ Click the **Save images in new series** option in the **Save As** dialog box.
- ◆ Enter a new description for the series in the text input field.
- ◆ For images of a subtraction or Roadmap study, select the image type.
  - **Native:** The original data set (native images and additive image of the mask, without subtraction image) is saved.
  - **Subtracted:** Only the subtracted images are saved. Subtraction functions can no longer be performed with these data.
- ◆ Confirm by clicking **OK**.
- The images are saved in a new series.

---

### Appending images to an existing series

If you do not want to create a new series for your processed and evaluated images, you can append them to an existing series.

- ◆ To do this, click **Append images to series** in the **Save As** dialog box.
- ◆ Select the series from the selection list using the series number and description.
- ◆ For images of a subtraction or Roadmap study, select the image type.
  - **Native**: The original data set is saved.
  - **Subtracted**: Only the subtracted images are saved. Subtraction functions can no longer be performed with these data.
- ◆ Confirm by clicking **OK**.
  - The images are saved in the specified series.

### *Restoring image display*

You can reset modified image processing parameters (e.g. window values, edge filter, zoom/pan) in order to reapply the values that were valid when you last saved the image. This will also reset any image evaluation steps (e.g. shutter or measurements) that were performed after the relevant image was last saved.

- ◆ Select the images in the image area of the **Viewing** task card.
- ◆ Select **Edit > Reset All**.

— or —



- ◆ Click the **Reset All** button in the **Save/Undo** subtask card.
- All selected images are reset to their original state (before they were processed).

### *Archiving, sending or filming images*

After an examination or postprocessing, the images are stored in the local database from where they can be accessed for reporting or documentation, for example.

#### *Archiving images*

Using the **Archive to...** function, you can save patient and examination data to an archive via the network (only with DICOM option).



*Please note that CDs are not archive media. Saving and keeping data on CD-RW does not comply with archiving requirements.*



*For images of a subtraction or Roadmap study, you can select whether you want to send native images or only the subtracted images.*

- ◆ Select the images that you want to archive.
- ◆ Select **Transfer > Archive to....**

— or —



- ◆ Click this button in the **Transfer** subtask card.
  - The **Archive To** dialog box is displayed.
- ◆ Select the required archive destination in the **Archive To** dialog box.
- ◆ Click **Archive**.
  - The data are archived to the selected destination.  
(→ Register 6: Filming/Printing and Archiving, **page 67**)



## *Sending images (DICOM option)*

If your system is connected to a network, you can send patient and examination data to other workstations using the **Send to...** function.



*For images of a subtraction or Roadmap study, you can select whether you want to send native images or only the subtracted images.*

### **Send images to node 1**

- ◆ Select the data that you want to send.
- ◆ Select **Transfer > Send to Node 1**.

— or —



- ◆ Click the corresponding button in the **Transfer** subtask card.
- The data are sent to the selected address.

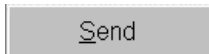
### **Sending images to a specific network address**

- ◆ Select **Transfer > Send to....**

— or —



- ◆ Click the button in the **Transfer** subtask card.
- ◆ Select the required network address(es) in the **Send To** dialog box.



- ◆ Click **Send**.
- The selected data are sent to the required address(es).

### Filming images

You can also use the **Viewing** task card to select images and copy them to the **Filming** card (DICOM option).



*Make sure the printer is switched on before you send images to print.*

### Transferring images to Filming

- ◆ Select the images in the image area of the **Viewing** task card.

- ◆ Select **Patient > Copy to Film Sheet**.

— or —



- ◆ Click the corresponding button in the **Filming** subtask card.

- All the selected images are transferred to the "virtual film sheet" (**Filming** task card or **Film Preview** window). There you activate the **Auto Expose** option, and the images are exposed on film or printed on paper as soon as the film sheet has been filled, or they are first collected in a film job.

### Exposing images on film

Patient images that you have collected in a film job can be printed or exposed on film from the **Viewing** task card. To do that, you do not need to switch to the **Filming** task card.

- ◆ Select **Patient > Expose Film Task**.

— or —



- ◆ Click the button in the **Filming** subtask card.

- All images of the film job are transferred to the camera.

---

## *Transferring images to the References task card*

In the **Viewing** task card, you can transfer images to the **References** task card for further evaluation.



- ◆ Select the images or series you want to process in the **Viewing** task card.
- ◆ Click the button in the **References** subtask card.
- The images are copied to the **References** task card.  
(→ Register 4: Examination, page 21)

### *Closing the patient*

When you have finished image processing -and evaluation in the **Viewing** task card, you can close the patient. If images of several patients are loaded, you can close all patients in one step.

If images of a current examination are loaded, the patient will be closed when the examination is ended. This can also be initiated in the **Viewing** task card.

#### **Closing the patient**

- ◆ Select **Patient > Close Patient**.
  - The current patient folder is closed.

or

- ◆ Select **Patient > Close All**.
  - All patient folders are closed.
  - The images are unloaded from the **Viewing** task card.
  - You can now load images of another patient for postprocessing.

#### **Finishing an examination**

- ◆ Select **Patient > End Examination**.

— or —



- ◆ Click the **End Examination** button in the **Patient** subtask card.
  - The images are unloaded from the **Viewing** task card and the examination is ended.
  - You can now register the next patient for examination.



---

## Viewing configuration

In the **Viewer Configuration** window, you can adapt the user interface and program operation of the **Viewing** task card to your method of working.

You can change and make the following settings:

- ☐ Standard layout of the image area of the **Viewing** task card
- ☐ Generation of annotation text
- ☐ Presettings for saving Sub/Roadmap image data
- ☐ Standard layout of the image area of the **References** task card
- ☐ Behavior of reference images during loading
- ☐ Settings for image text display (configuration via image text editor)

## Calling up the configuration window

You can call up the configuration from the syngo **Configuration Panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the **Viewer** button.
  - The **Viewer Configuration** window appears.



Viewing

or



ImageText  
Editor

- ◆ Double-click the **Image Text Editor** button, if you want to configure image text display.
  - The **Image Text Configuration** window is displayed.

### *Concluding configuration*

If you have changed the settings in the cards of the configuration window, you must confirm them. If you have changed parameters by accident, you can reset these values to default values or reject all your changes.

#### **Applying changes**

- ◆ Confirm by clicking **OK**.
  - All changes are applied.
  - The **Viewer Configuration** dialog window is closed.

or

- ◆ Click **Apply**.
  - The changes of the current card are applied.
  - The **Viewer Configuration** dialog window remains opened.
- The changed settings are automatically applied the next time you load data into the **Viewing** task card the next time.

#### **Resetting to default settings**

- ◆ Click **Default**.
  - The values of the current card are reset to standard values.
  - The **Viewing Configuration** dialog window remains opened.

#### **Discarding changes**

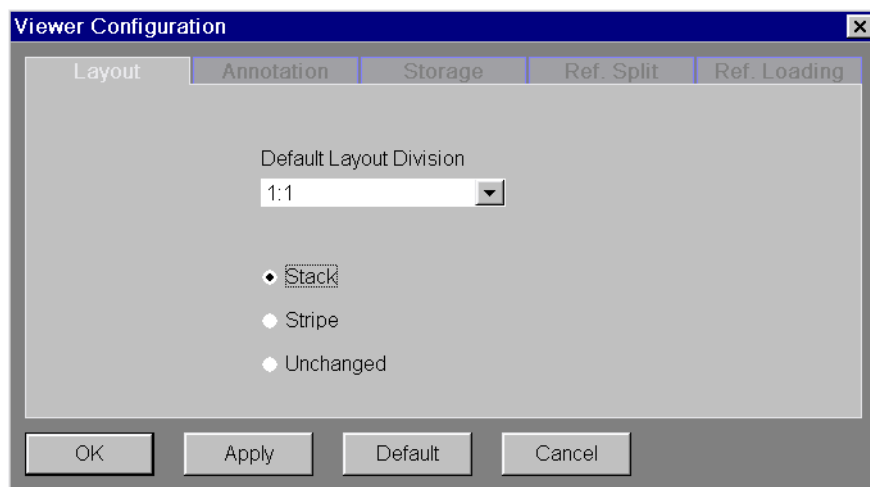
- ◆ Click **Cancel**.
  - The changes are not applied.
  - The **Viewer Configuration** dialog window is closed.

## *Division of the image area*

On the **Layout** card, you define the number and size of the segments in the image area.

The standard layout is 1:1 (full screen). This is the most suitable layout for detecting diagnostic details. For overview purposes you can set a layout with several images per page (4:1, 9:1 or 16:1).

### **Changing the size of the layout**



- ◆ Click the **Layout** card into the foreground.
- ◆ Select the size of the layout from the selection list.
  - After the images have been loaded into the **Viewing** task card, they are displayed in the selected layout size.

### Setting the type of layout

- ◆ Click the **Stripe** option.
  - You can view the loaded series of a study one after the other image by image.

or

- ◆ Click the **Stack** option.
  - All images of a series are now arranged in a stack one on top of the other.

or

- ◆ Click the **Unchanged** option.
  - All images are displayed in the type of layout that was used last.



*Stack is the default setting for the layout type.*

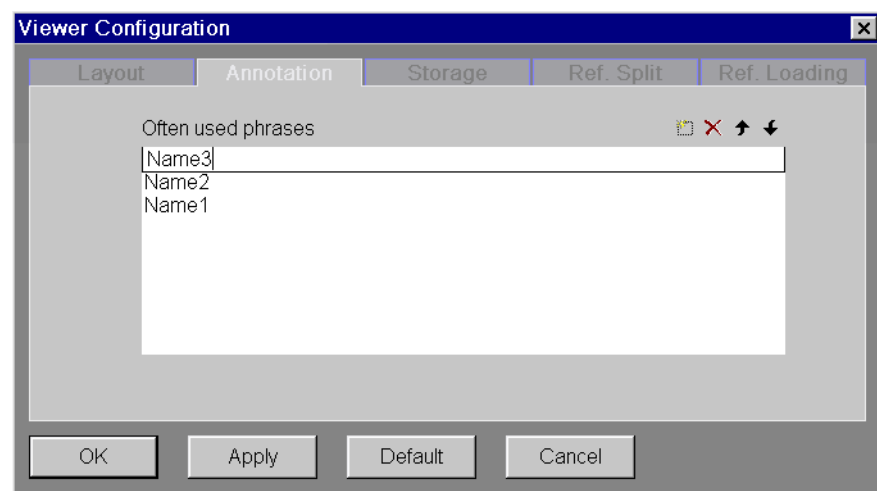
## Creating annotation texts

Texts that are often used can be created on the **Annotation** card. You can also delete texts or change existing annotations. The created texts must not exceed one line and 50 characters.



*The entered texts are available for selection, if you have enabled the **Tools > Annotation Arrow** function in the **Viewing** task card and then click into the image with the right mouse button.*

### Creating a new text



- ◆ Click the **Annotation** card into the foreground.



- ◆ Click the **Paste** button.
- ◆ Double-click the empty box.
- ◆ Enter the new text.



- ◆ Click the **Paste** button or press the **Enter** key.
- The new annotation text is placed in the top position of the list.

### Changing text

- ◆ Double-click an existing box.
- ◆ Enter the new text.
- ◆ Click the **Enter** button.
- The modified annotation text is displayed.

### Deleting an existing text

- ◆ Select a text in the list of annotation texts.
- ◆ Click the **Delete** button.
- The selected text is deleted.



### Moving texts

- ◆ Select a text in the list of annotation texts.
- ◆ Click the **Move up** button.
- or –
- ◆ **Drag&drop** the text to the required position.
- The selected text is moved up one line.



or

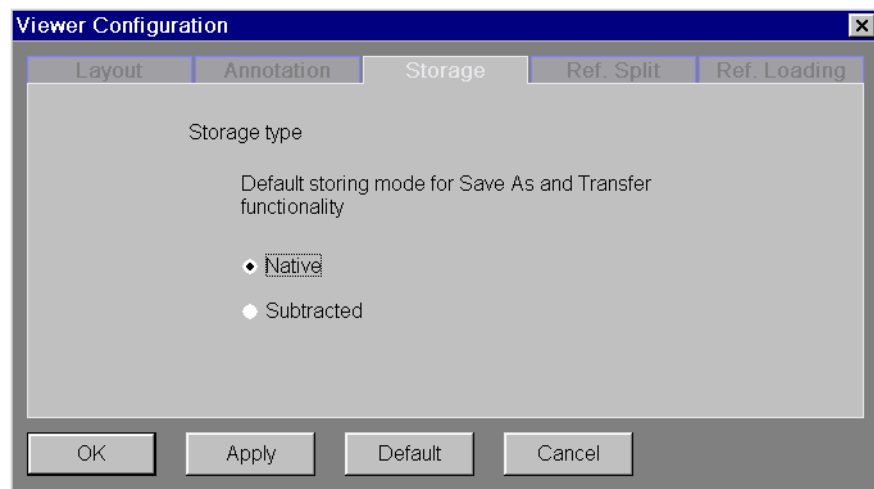
- ◆ Click the **Move down** button.
- or –
- ◆ **Drag&drop** the text to the required position.
- The selected text is moved down one line.



---

## *Saving Sub/Roadmap image data*

In the **Storage** card you define the presets for the **Save as** dialog. The setting is for saving images of a subtraction or Roadmap examination and is used as default for exporting and sending images via the **Transfer** menu.



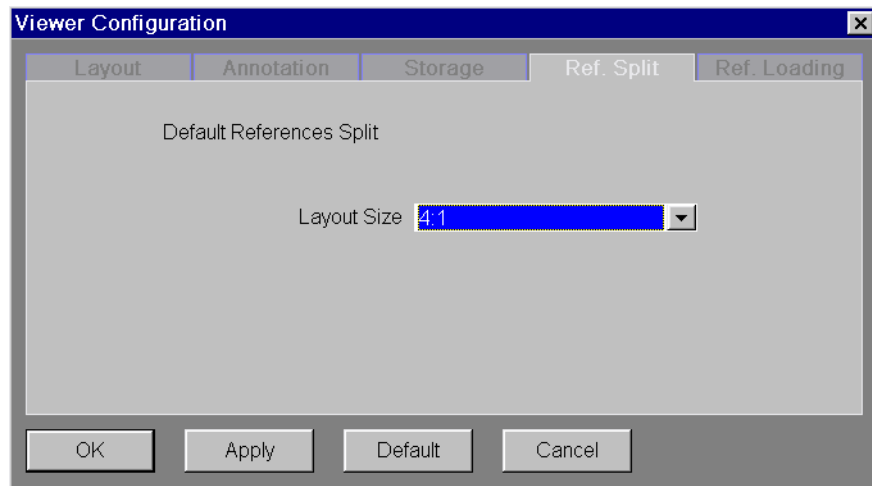
- ◆ Click the **Storage** card into the foreground.
- ◆ Click the **Native** option.
  - The original data set will be saved by default.

or

- ◆ Click the **Subtracted** option.
  - Only the subtracted images will be saved by default. Subtraction functions can no longer be performed with these data.

## Setting the layout in the References task card

In the **Ref. Split** card you can define the division of the image area, when images are loaded in the **References** task card.



- ◆ Click the **Ref. Split** card into the foreground.
- ◆ Select the size of the layout from the selection list.
- Loaded images are displayed in the selected layout size in the **References** task card, if the **Monitor split** button is selected at the C-arm system.



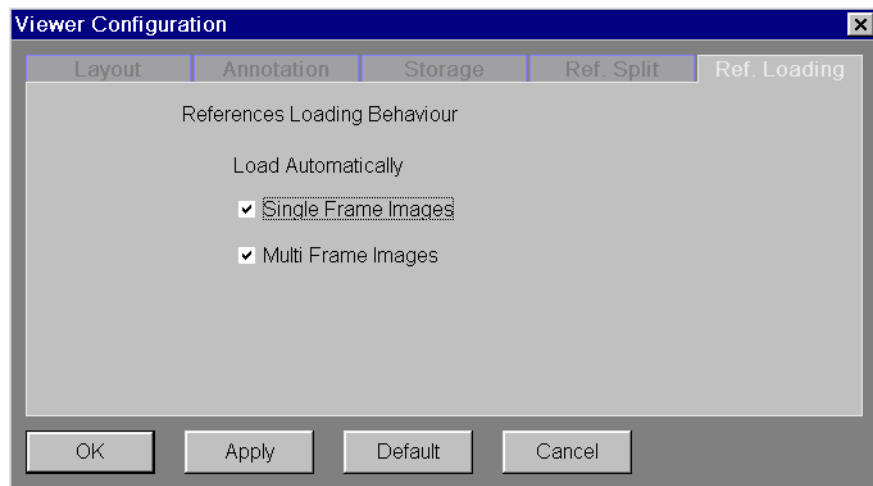
*You can set the following layout sizes: 4:1, 9:1, 16:1 Automatic.*

*The standard setting for the layout size is 4:1.*



## *Loading reference images during an examination*

In the **Ref. Loading** card you can define whether single images and scenes stored during an examination are automatically loaded into the **References** task card.



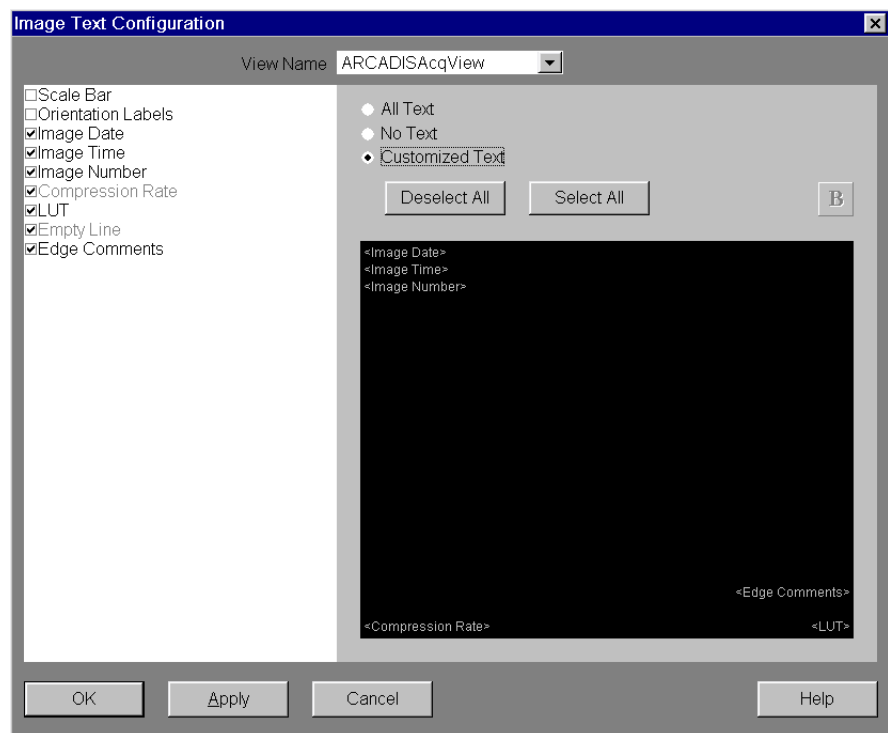
- ◆ Click the **Ref. Loading** card into the foreground.
- ◆ Click the **Single Frame Images** check box.
  - Single frames are automatically loaded into the **References** task card during the examination.
- ◆ Click the **Multi Frame Images** check box.
  - Multiframe images (scenes) are automatically loaded into the **References** task card during the examination.



*In the default setting, both check boxes are activated.*

## Configuring image text display

In the **Image Text Configuration** dialog you can set which image text information is to be displayed by default with individual basic formats. The dialog box is opened by clicking the **Image Text Editor** button in the syngo **Configuration Panel**.



- ◆ In the **View Name** selection list, select the basic format for which your configuration settings apply.
- ◆ Select either **All Text** or **No Text**.
  - By default, all available image texts or no image text are/is displayed.

or

- ◆ Click **Customized Text** and select the required information from the column on the left.
  - By default, the selected image texts are displayed.

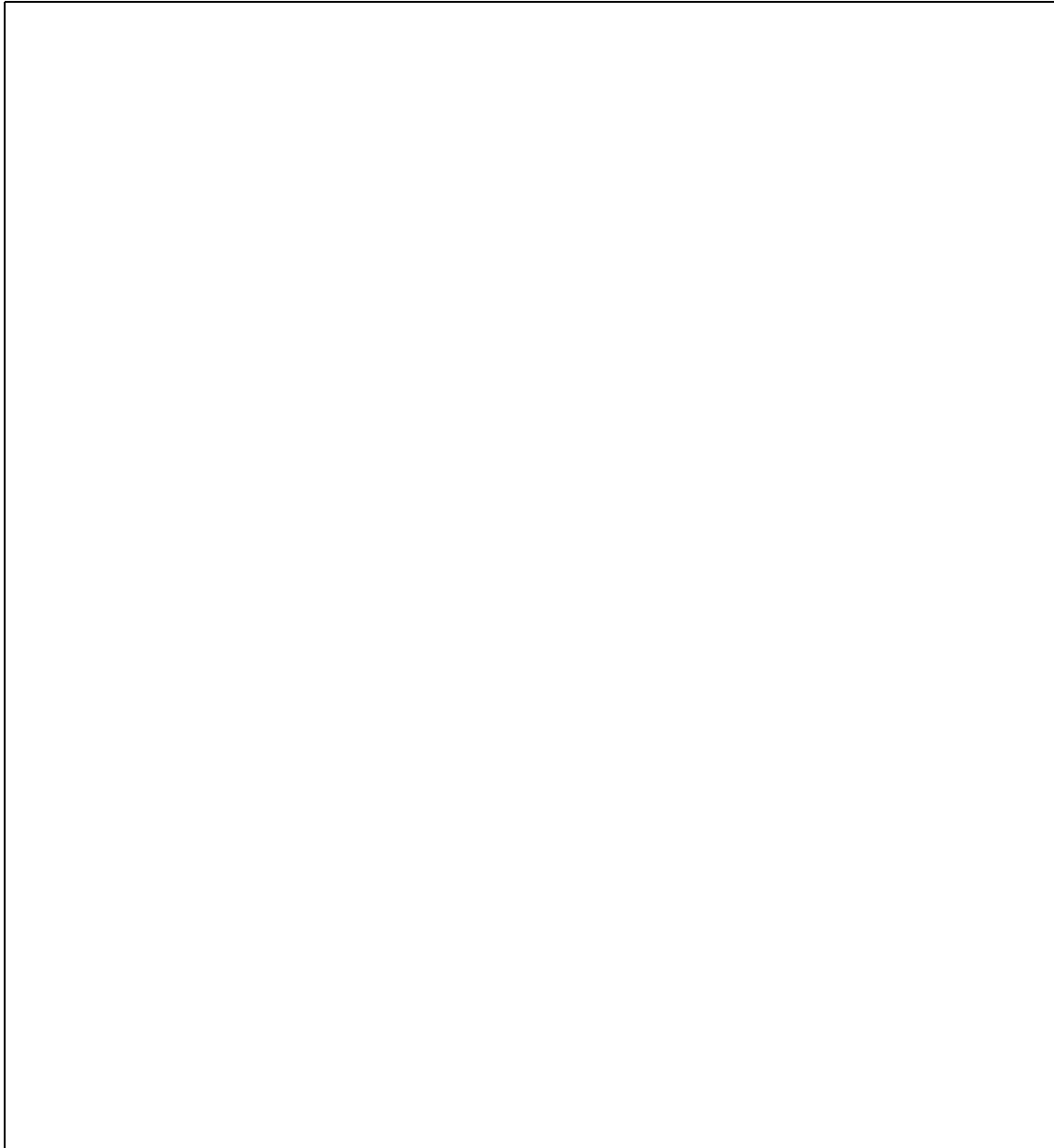
# SIEMENS

**Operator Manual**

**ARCADIS Avantic**

**Filming/Printing and Archiving**

**SP**



Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

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## Introduction to filming/printing

You can expose the images of an examination on film or print them on paper for documentation and reporting.



*Filming and printing are the same process except that they use different output devices. Even though the following text may only use the term “filming”, (e.g. with software elements), the description applies equally to printing.*

- |                          |  |
|--------------------------|--|
| <b>Film job</b>          | Selected images, series and studies that you have sent for filming are managed and executed by the system as film jobs.  |
| <b>Multiple film job</b> | In general, images of different patients are processed in different film jobs. However, you can permit images of different patients to be grouped together as a multiple film job.   |
| <b>Film task status</b>  | You can also obtain information about the processing status of film jobs in the camera/printer queue in the <b>Film Task Status</b> dialog box and intervene in the sequence of execution.   |
| <b>Film preview</b>      | Images in film jobs are not immediately printed or exposed on film, but are first transferred to a virtual film sheet. In the <b>Film Preview</b> window, you can see how the images will later be arranged on the exposed film or printout.   |
| <b>Filming task card</b> | In addition to the <b>Film Preview</b> dialog, the <b>Filming</b> task card is also available to you as a virtual film sheet. Besides the basic functions of the <b>Film Preview</b> window, the <b>Filming</b> task card provides a number of additional functions and configuration possibilities that enable you to adapt the filming and printing process to your specific requirements. |



*Please remember that not all transfer options may be available on your system. The devices and network nodes available depend on the individual configuration of your system and the options installed.*

### *Filming and printing*

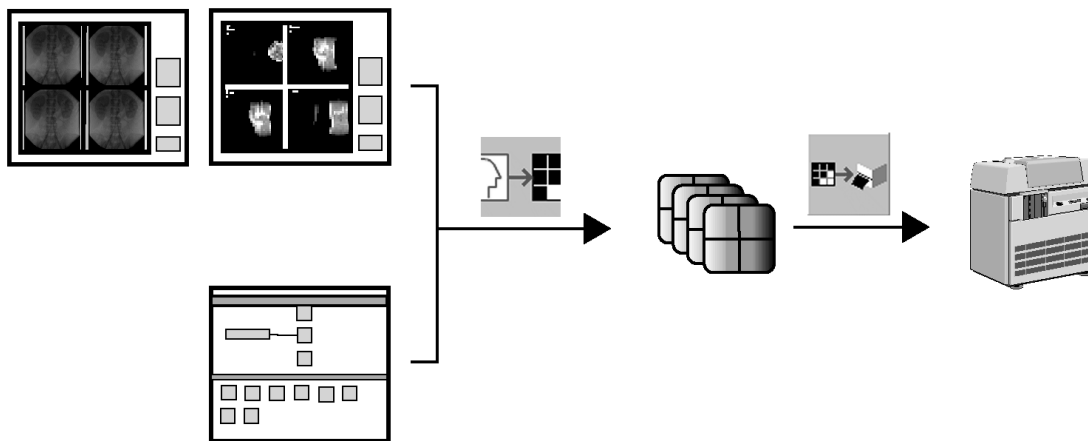
Image material is filmed/printed in two steps:

- ☐ First, specify on one of the task cards or in the **Patient Browser** which images or series you want to print or expose on film. Then transfer the selected images to the virtual film sheet.
- ☐ From the virtual film sheet, you can either send your selected images directly to a camera/printer, or you can perform additional processing steps first.

Image material can be printed or exposed on film either automatically or manually.

#### **Manual filming**

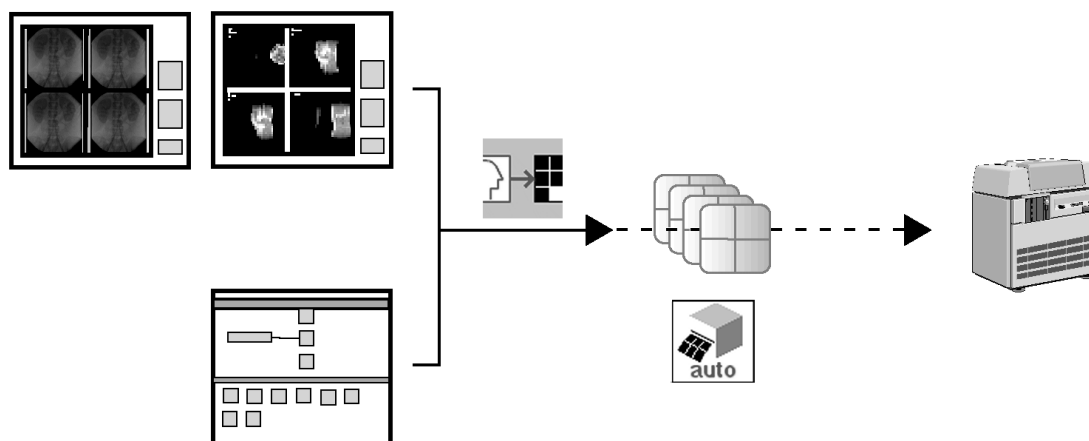
You transfer images to the virtual film sheet. After that, you manually initiate the transfer to the camera or printer. In doing so, you can select the images that you want to expose on film or print.





### **Automatic filming**

You transfer images to the virtual film sheet. As soon as a film sheet is filled, the images are automatically output on camera or printer.



### *Layouts and settings*

All film settings such as the layout of the film sheet or the selected camera/printer are defined in so-called film layouts.

#### **Standard layout**

Provided that you do not make any changes to the default film settings, you always work with the general default layout defined by Siemens Service during installation of your system.

#### **Changing film settings**

If you are not satisfied with the default film settings (standard layout), you change individual film settings using the virtual film sheet. The current film job is then processed with your new settings. For the next film job, the system will use the default settings again.

#### **Study-specific layouts**

In the **Configuration** of the **Filming** task card, you can define special film settings for individual studies and series. Whenever you film or print images of a study or series of the same type, the system automatically accesses this study-specific layout.

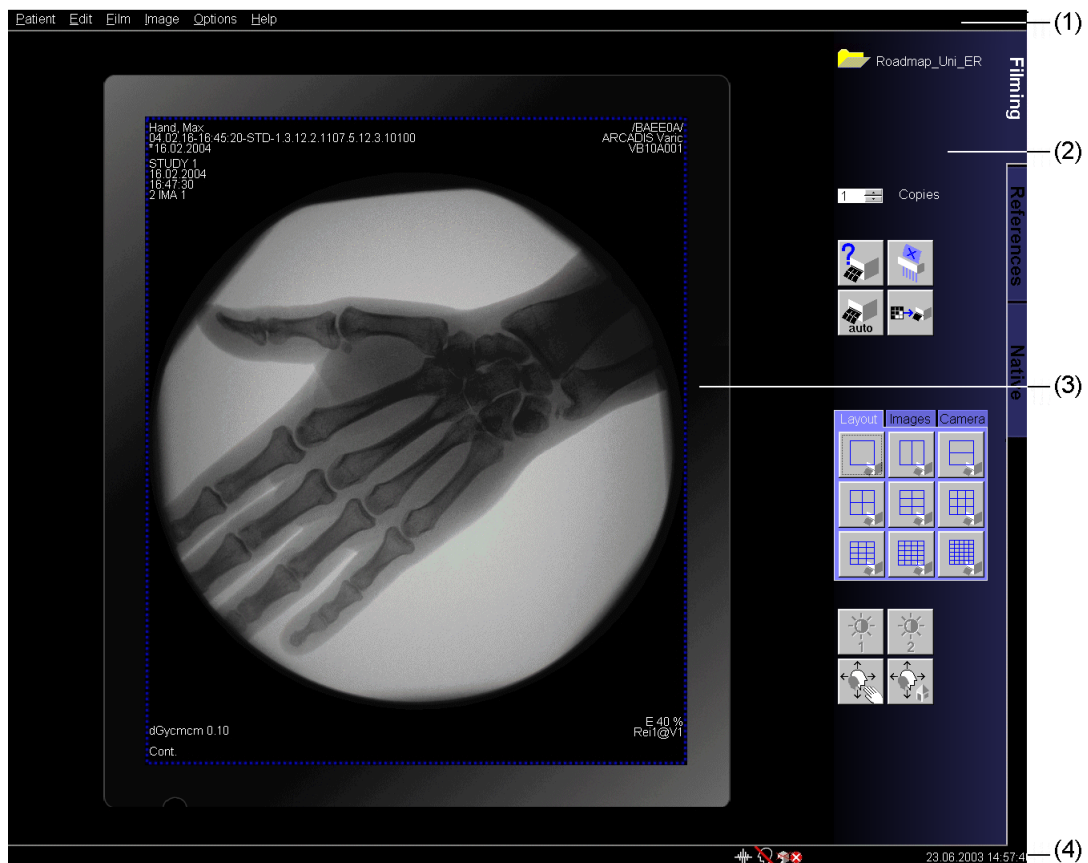
#### **Print modes**

The regular page mode is the default print mode. The scalable page mode provides images with reduced quality and does not support original size.

## The Filming task card

If you want to change individual film sheets of the jobs in the queue or if you want to process the images again before filming, switch to the **Filming** task card.

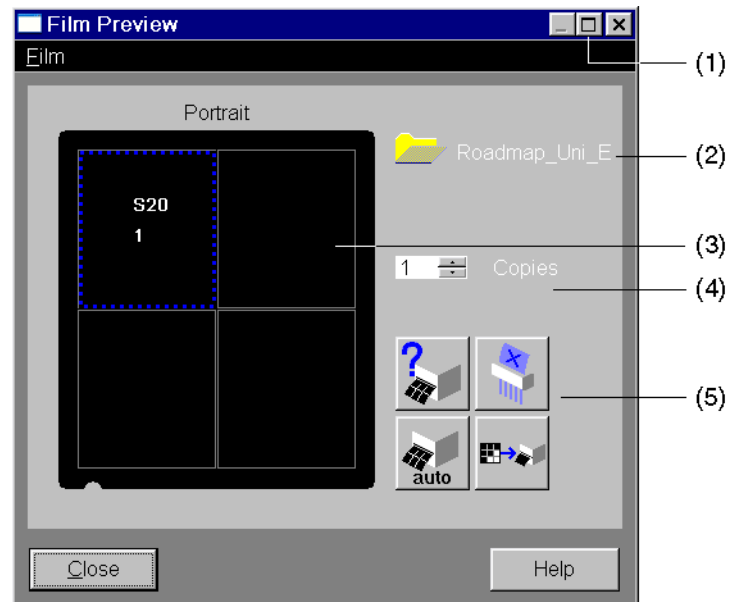
The **Filming** task card is divided in four main areas.



- (1) Menu bar with menu entries for filming
- (2) Control area allowing easy access to processing functions
- (3) Display of the film sheets (virtual film sheet)
- (4) Status bar for system messages

### *The Film Preview window*

If you want to obtain a quick overview of queued film jobs that have not yet been sent to the camera or printer, you can use the **Film Preview** window.



- (1) Maximize to **Filming** task card
- (2) Film jobs
- (3) Display of film sheets
- (4) Spin box for selecting the number of copies
- (5) Buttons for film control and delete button



*The **Film Preview** dialog can be opened only from the **Patient Browser** by selecting **Patient > Film Preview**.*

## *Automatic / manual filming*

The filming and printing of examination images is performed in two steps:

- ❑ Transfer of images to the virtual film sheet.
- ❑ Transfer of these images from the virtual film sheet to a camera or printer where they are exposed on film or printed on paper.



*Make sure the printer is switched on before you send images to print.*

### **Configured printers/ cameras**

Siemens Service or your system administrator has configured one or several printers/cameras for your ARCADIS Avantic system. At the same time, the names of output devices that you can choose from selection lists as well as the specified paper/film size were set up.



*Note that you can only print on the paper/film size that was configured for the respective output device.*

## *Transferring images to the virtual film sheet*

Images can be transferred for printing from different applications via the control panel on the C-arm system or at the monitor trolley.

### *At the C-arm system*

If a local printer is connected, you can print individual images on paper or X-ray film directly in the OR.

#### **Initiating local printing**



- ◆ Press the **Print** key on the control panel of the C-arm system.
  - The currently selected image is copied to the virtual film sheet.
  - Depending on the setting for exposure on film, the image is transferred directly to the specified (local) printer and printed there.

### *At the monitor trolley*

You have the possibility of selecting and filming/printing single images or all images of a series, a study or a patient.

#### **Selecting images**

You decide on the **Viewing** task card or in the **Patient Browser** window which images you want to transfer to the virtual film sheet. You can use the large format layout when selecting images in the **Viewing** task card.

- ◆ Select **Patient > Browser**.
    - The **Patient Browser** opens.
  - ◆ Select the images for filming in the navigation or content area.
- or
- ◆ Load the series or study containing the images that you want to film into the **Viewing** task card.  
(→ Register 5: Viewing, page 13)
  - ◆ Select the images for filming in the image area.

#### **Transferring images**

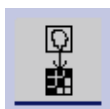
- ◆ Select **Patient > Copy to Film Sheet**.

or



- ◆ Click the **Copy to Film Sheet** button.

or



- ◆ Press the **Copy to Film Sheet** key on the symbol keypad.
  - All the selected objects are transferred to the virtual film sheet.

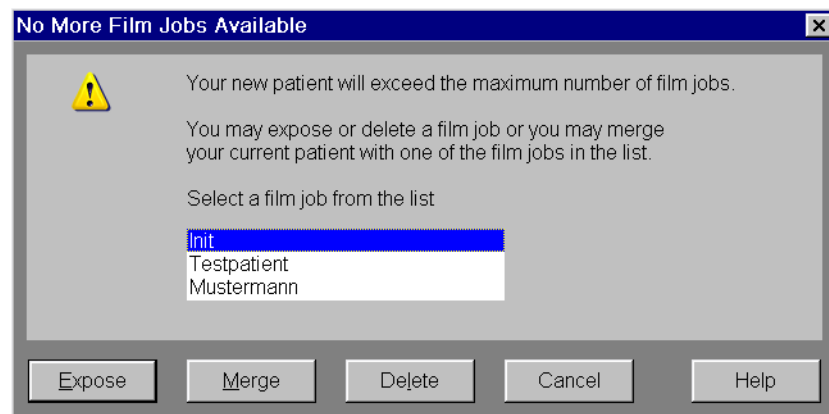


*You cannot transfer scenes from the **Patient Browser** to the **Filming** task card.  
If one of the images selected for transfer is a scene, you will receive a corresponding message.*

## *Virtual film sheet full*

In general, every time you transfer images of a series or whole studies of a patient to the virtual film sheet, a film job is created.

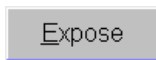
No more than 3 film jobs at a time can be managed in the virtual film sheet. If a fourth film job is transferred to the film sheet, the **No More Film Jobs Available** dialog box appears.



*This situation can generally only occur if the **Auto Expose** option is deactivated for the film jobs. The film jobs then remain in the virtual film sheet until you send them to filming manually and thus complete them.*

You must first expose/print or delete one of the film jobs in the queue before a new film job can be accepted.

### Exposing the selected film job



- ◆ Select one of the film jobs listed.
- ◆ Click **Expose**.
  - The selected job is filmed and the new job is placed in its position in the virtual film sheet.

### Deleting a selected film job



- ◆ Click **Delete**.
  - The selected job is deleted and the new job is placed in its position.

### Merging film jobs



- ◆ Click **Merge**.
  - The images of the new film job are appended to the end of this old film job.



*The film job remains in the virtual film sheet as a multiple film job until you transfer it to the camera or printer.*

*(→ page 3)*



## *Sending images to the camera/printer*

Images can be transferred to the camera or printer via the same menu entries in the different task cards or in the **Patient Browser**.

### *Automatic exposure*

After a film job has been transferred completely to the virtual film sheet, it can immediately and automatically be transferred to the camera/printer.

---

### **CAUTION**

The "Printed" flag is set as soon as the images have been successfully transferred to the printer control. Not all printers (e.g., paper printers) can solve printing problems themselves.

#### **The image printout may be lost!**

- ◆ Verify that the printouts are available before you delete images.
- 

#### **Activating automatic exposure**

- ◆ Select **Options > Auto Expose** on the right monitor.

or



- ◆ Click the **Auto Expose** button.
- A film sheet that is completely filled is automatically printed or exposed as soon as an image for the next (empty) film sheet is transferred.



*If the last film sheet is only partially filled, it depends on the configuration when it is sent to filming.*

*(→ page 54)*

### Deactivating automatic exposure

- ◆ Deselect **Options > Auto Expose**.

or



- ◆ Click the active **Auto Expose** button.



#### Aborting automatic exposure

If errors occur during automatic filming, or you notice that defective images have been filmed/printed, you can abort automatic exposure at any time.

- ◆ Deselect **Options > Auto Expose** on the right monitor.
- ◆ Eliminate the fault.
  - or —
  - ◆ Delete the faulty images from the virtual film sheet.
  - ◆ Activate **Auto Expose** again.
  - or —
  - ◆ Transfer the remaining sheets to the camera/printer manually.

### *Transferring images manually*

If the **Auto Expose** option is deactivated, all images to be filmed are collected in the virtual film sheet as film jobs. You decide which jobs are filmed or printed at what time.

---

#### CAUTION

The "Printed" flag is set as soon as the images have been successfully transferred to the printer control. Not all printers (e.g., paper printers) can solve printing problems themselves.

#### **The image printout may be lost!**

- ◆ Verify that the printouts are available before you delete images.
- 

#### **Exposing the current film task**

- ◆ Select **Film > Expose Film Task**.
  - All images of this film job are transferred to the camera or printer.

or



- ◆ Click the **Expose Film Task** button.
  - All images of the film job are transferred to the camera.



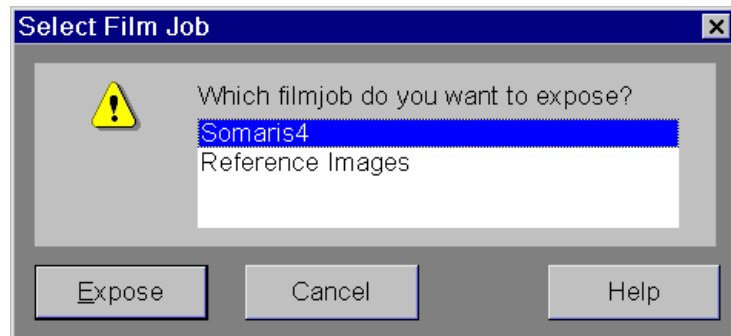
*If you only want to expose a single film sheet, instead of a whole film job, select the requested sheet in the **Filming** task card or in the **Film Preview** window and expose it from there.*

*(→ page 17)*

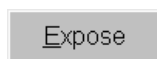
### Selecting a film job

If you have loaded several patients into the **Filming** task card, you can select the task you want to expose from the list displayed in the **Select Film Job** dialog.

- ◆ Select **Patient > Expose Film Task**.
  - The **Select Film Job** dialog box is opened.

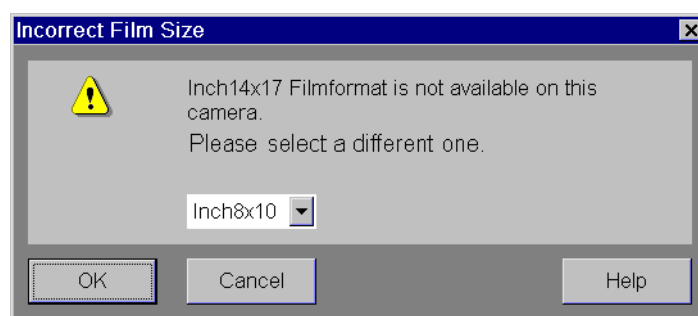


- ◆ Select a job.
- ◆ Click **Expose**.



### *Correcting the film size*

If the film size set for the film sheet waiting to be exposed/printed is not supported by the selected camera, the **Incorrect Film Size** dialog box is displayed.



### Selecting a different size

- ◆ Select the film size configured for the camera/printer from the selection list.
- ◆ Confirm by clicking **OK**.
  - Filming/printing is resumed.

## *Viewing and processing film sheets and images*

Once you have deactivated the **Auto Expose** option during manual filming, you can view and process the film sheets again before finally printing them or exposing them on film.

### **Film preview**

If you want to obtain a quick overview of the film jobs in the queue that have not yet been sent to the camera or printer, you can use the **Film Preview** window.

### **Filming task card**

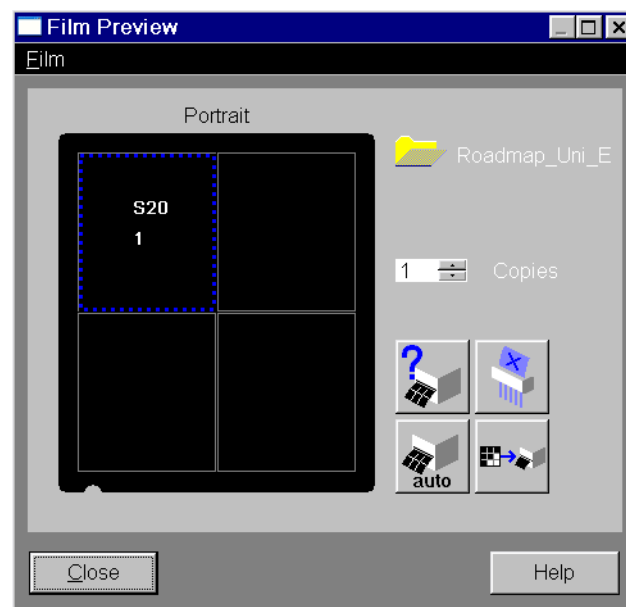
If you want to organize individual film sheets of the jobs in the queue more efficiently and clearly or if you want to process the images again before filming, switch to the **Filming** task card.

### *Film preview*

In the **Film Preview** window, you can also access some basic functions for filming without having to switch to the **Filming** task card.

### *Calling up the film preview*

- ◆ Select **Patient > Film Preview...** in the **Patient Browser**.
- The **Film Preview** window is displayed.



### *Basic functions*

After you have called up **Film Preview**, the window will appear in front of the application you are currently working with.

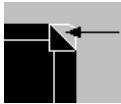
#### **Viewing film jobs**



- ◆ Click on a film job.
- The film job is opened.

#### **Scroll through the display area**

Using the dog ears in the top right-hand corner, you can scroll through all the film sheets of the film job.



- ◆ Click once on the outer triangle.
- The film sheet is paged forward.

or



- ◆ Click once on the inner triangle (dog ear).
- The film sheet is paged backward.

#### **Film task status**



- ◆ Click the **Film Task Status** button.
- or
- ◆ Select **Patient > Film Task Status**.
- The **Film Task Status** dialog box is opened.



### Selecting Auto Expose

- ◆ Click the **Auto Expose** button.

or

- ◆ Select **Options > Auto Expose**.

- The opened film job is automatically exposed.

### Exposing a film job

---

#### CAUTION

Using paper printouts for diagnosis of AX, CT and MR images.

#### Wrong diagnosis possible!

- ◆ Only use film material and cameras/printer appropriate for diagnostic purposes.



- ◆ Click the **Expose Film Task** button.

or

- ◆ Select **Patient > Expose Film Task**.

- The opened film job is transferred to a camera/printer.



### Exposing/printing a film sheet

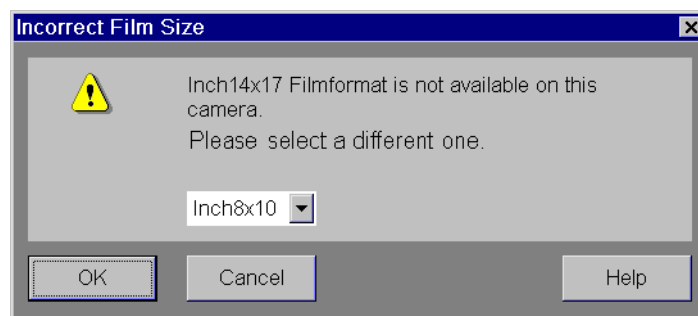
Instead of a whole film job you can also transfer single film sheets to the camera or printer.

- ◆ Select a film sheet.
- ◆ Select **Film > Expose Film Sheet**.
- Only the selected film sheet is processed.



#### Incorrect film size

If the film size set for the film sheet waiting to be exposed/printed is not supported by the selected camera, the **Incorrect Film Size** dialog box is displayed.



- ◆ Select the film size configured for the camera/printer from the selection list.
- ◆ Confirm by clicking **OK**.
  - Filming is resumed.

### *Changing default settings*

By default a layout has already been defined for every film job in the virtual film sheet and a camera or printer has been selected.

You can change these default settings in the **Film Preview** dialog window or in the **Filming** task card itself.

#### **Selecting a camera or printer**

- ◆ Select **Film > Change Camera....**

– A dialog box is opened in which you can select a new camera/printer.



*Note that you can only print on the paper/film size that was configured for the respective output device.*

#### **Changing film settings**

- ◆ Click in a segment or on the border of the film sheet.

— or —

- ◆ Select a film job.

- ◆ Select **Film > Properties....**

or

- ◆ Right-click in a segment or on the border of the film sheet.

- ◆ Select **Properties** from the opened pop-up menu.

– The **Film Properties** dialog box is opened in which you can change a series of layout settings for filming.



*The **No text** option should not be used since otherwise image text and the patient name will not be visible on the film sheet. This can easily lead to confusions.*

### *Processing a film sheet*

The **Film Preview** dialog offers a number of functions for reorganizing film sheets.

#### **Deleting images**



- ◆ Click the delete button in the control area.
  - The selected image is deleted. The following images move up so that no empty segments remain.

or

- ◆ Select **Film > Clear Document(s)**.
  - The image is deleted. The following images do not move up.
- ◆ Enter **Film > Repack**.
  - Your film material is now used more efficiently.

#### **Adding images**

If you have opened the **Film Preview** from the **Patient Browser** window, you can add further images to a film job.

- ◆ Select **Film > New Film Sheet**.
  - An empty film sheet is added to the end of the film job.
- ◆ Select **Patient > Copy to Film Sheet**.
  - These images are also appended to the end of the film job.

### *Processing film jobs and film sheets*

In addition to the simple processing steps in the **Film Preview**, you can also make complex and extensive changes to film jobs in the **Filming** card.

### *Calling up the Filming task card*

The **Filming** task card is in the stack of task cards on the right-hand monitor.



- ◆ Click the **Filming** tab.

or



- ◆ Maximize the **Film Preview** window.
  - The **Filming** task card is placed in the foreground.

### Selecting a film job

By the patient folders in the upper part of the control area you can see which film jobs are currently waiting to be transferred to a camera/printer.

#### Designations

These jobs have one of the following designations:

☐ Patient name

A film job that contains the images of a patient.

☐ Multiple

A film job that contains the images of several patients.



*If there is no film job in the virtual film sheet, a patient folder labeled **New** is displayed.*

#### Opening a film job



◆ Click on a film job.

– The film job is opened.



*The patient folder opens up and the color of the folder remains unchanged.*

#### Selecting an entire film job

◆ Click again on the opened film job.

– All the film sheets with all images of this job are selected.



*The folder icon is now highlighted (blue), and all the images of this job are shown in the film sheet display with a clear border and are therefore selected.*

### Setting multiple printout



- ◆ Select the number of copies with the spin buttons.

or

- ◆ Enter the required number of copies using the keyboard.

### *Selecting film sheets and images*

After you have opened a film job, its images are displayed in the left-hand part of the **Filming** task card.

### Paging through several film sheets

- ◆ Page through the film sheets using the dog ears.

or



- ◆ Double-click on the number of the current film sheet.
  - The display field becomes an input field.



- ◆ Overwrite the number displayed with the number of the sheet that you want to go to.
- ◆ Press the **Enter** key.
  - The film sheet you have entered is displayed.

### Selecting a film sheet

- ◆ Click on the border of the film sheet.
- All the segments of the film sheet are now shown with a clear border.

### Deselecting a film sheet

- ◆ Click outside the film sheet with the left mouse button.
- or
- ◆ Select a single image, another film sheet or another film job.
  - Your selection is canceled.

### Selecting multiple selection

You can also select several film sheets at once.

- ◆ Click on the border of the first film sheet of your choice holding the **Ctrl** key down.
- ◆ Page to another film sheet.
- ◆ Hold the **Ctrl** key pressed to extend your selection by a single film sheet.

or

- ◆ Hold the **Shift** key pressed to select all the film sheets between the two film sheets including their images.



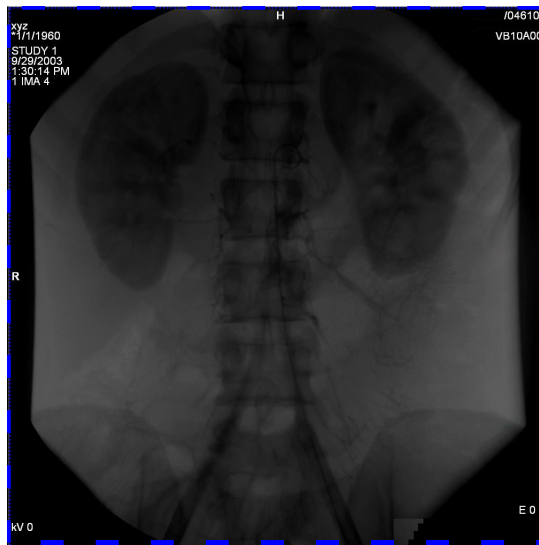
*When you have selected a film sheet, all images have a line border.*

### Selecting segments

You cannot only select whole film sheets, but also individual images of a film job.



The **Input Focus** shows the active segment of the image area. It is marked by a dashed border and shows you which image is currently being processed.



- ◆ Click on another image with the left mouse button to place the input focus on another segment.

or

- ◆ Move the input focus using the arrow keys on the keyboard.



### Selecting one or more images explicitly

- ◆ Click into a segment holding the **Ctrl** key down.
- The segment is marked with a line border.

### Selecting images explicitly up to the end of a series

- ◆ Click on the image that you want to select explicitly holding the **Ctrl** key down, or use the input focus.
- ◆ Select **Edit > Select On Succeeding**.
- The selected image and all the following images are now selected.

### Selecting a complete series explicitly

- ◆ Click on the image of the series that you want to select holding the **Ctrl** key down, or use the input focus.
- ◆ Select **Edit > Select Series**.
- The whole series is now selected explicitly.

### Deselecting images

- ◆ Hold the **Ctrl** button pressed.
- ◆ Click on an explicitly selected image again.

or

- ◆ Select **Edit > Deselect All**.
- All selected images are deselected.
- After that, the default input focus is set automatically, i.e. the top left segment is the destination of the next action.

### *Reorganizing film sheets*

Using the **Filming** task card, you can reorganize film jobs in such a way that only those images are exposed or printed that you require.

#### **Deleting images or film sheets**

- ◆ Select one or more images or film sheets or use the input focus.
- ◆ Select **Edit > Delete**.

or



- ◆ Delete the images/film sheets with this button.

or

- ◆ Select **Film > Clear Document(s)**.
  - The images are deleted, the segments in the film job remain empty.

#### **Filling empty segments**

- ◆ Select **Film > Repack**.
  - The gaps are filled.

### Copying images or film sheets

- ◆ First select the images/film sheets that you want to copy.
- ◆ Select **Edit > Copy**.
- ◆ Select the image in front of which you want to insert the copies.
- ◆ Select **Edit > Paste**.
- All the copied images are inserted in front of the selected segment. The image of this segment is moved back in the film job.

### Moving images or film sheets

- ◆ Select the image or the images that you want to move.
- ◆ Select **Edit > Cut**.
- ◆ Select the segment in front of which you want to move the cut-out images.
- ◆ Select **Edit > Paste**.

### Appending a new film sheet

- ◆ Select **Film > New Film Sheet** at any point in the film job.
  - A new (empty) film sheet is appended to the end of the film job.
- ◆ Then insert the copied or cut images into this sheet.

### *Edit images*

In addition to the arrangement of film sheets, you can also change the display parameters of the images on the **Filming** task card to obtain an optimum output result.

(→ Register 5: Viewing, page 33)



*On the **Filming** task card, images are loaded with the window values with which they were last saved. If you have transferred images from the **Viewing** task card, the images are displayed with the window values last used in the **Viewing** card.*

### **Windowing images**

With the **Window 1** and **Window 2** buttons, you can assign those window values that were permanently stored with the image data (e.g. with imported images). The images acquired at the system do not support different window values, the buttons are then deactivated (dimmed).

- ◆ Select one or more images, or work in the input focus.

- ◆ Click **Window 1** or **Window 2**.

- The windows are assigned the values of the first or second stored window.



### **Zooming and panning images**



- ◆ Click the **Zoom/Pan** button.

or

- ◆ Select **Image > Zoom/Pan**.

- The function of the left mouse button is now switched from *Select* to *Zoom/Pan*. Now you zoom the image and then pan it.

### **Restoring the zoom factor**

- ◆ Select **Image > Home Zoom & Pan**.

or

- ◆ Click the **Home Zoom/Pan** button.

- The images are assigned the zoom factor with which they were last stored in the database.



## *Changing film settings for a film job*

When your system is configured, a standard film layout is defined. This layout contains all the settings required for filming.

If these presettings are not suitable, you can change the following on the **Filming** task card or in the **Film Preview** dialog window:

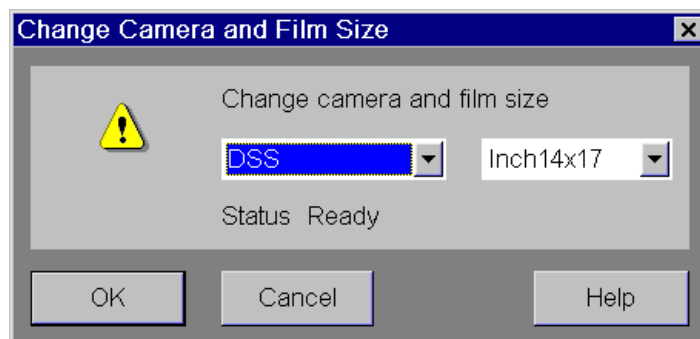
- ☐ Select another camera or printer
- ☐ Change the number of copies
- ☐ Change the layout of the film sheets
- ☐ Change the image, text and graphic display

### *Selecting a camera and printer*

If you do not want to expose or print your current film job with the default camera, then select another camera/printer for this job.



- ◆ Click the **Camera** subtask card on the **Filming** task card into the foreground.  
— or —
- ◆ Select **Film > Change Camera...**
  - The **Change Camera and Film Size** dialog box is displayed.



- ◆ Select a camera or printer from the list.
- ◆ Under **Film Size**, select the film size configured for the camera/printer.



*The newly selected camera or printer is used as the default camera or printer. These are used whenever no other device is selected.*

*In the **Status** display, you can see whether the selected camera/printer is switched on and available.*

## *Changing the layout of the film sheet*

With the layout of the film sheet, you can define the size of each image.

### **Selecting images and film sheets**

The film sheet layout is set for selected images of a film job.

- ◆ Select an entire film job.
  - The layout is changed for all sheets of this job.

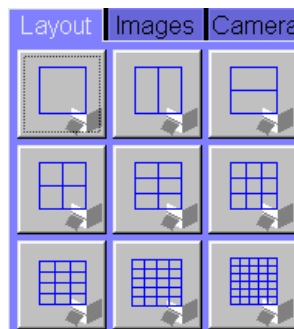
or

- ◆ Select a film sheet.
  - The layout is changed for this single sheet only.

or

- ◆ Select individual images, or work in the input focus.
  - The format for the relevant images is changed.

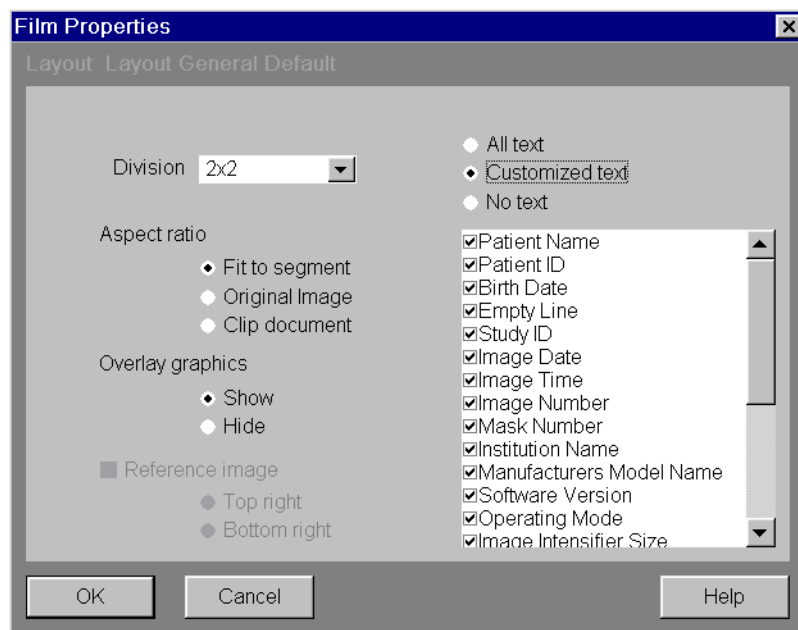
### **Changing the layout**



- ◆ Click the **Layout** subtask card on the **Filming** task card into the foreground.
- ◆ Click the button for a film layout.
  - The selected images are displayed in this format.

or

- ◆ Select **Film > Properties...** in the main menu or **Properties** in the context menu (right mouse button).
  - The **Film Properties** dialog box is opened.



- ◆ Select a division in the **Division** selection list.

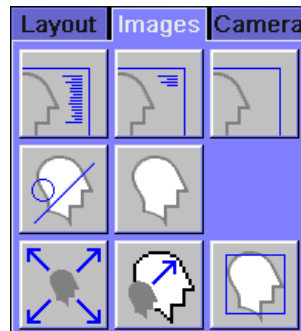


*If the film sheet division is different for the selected images or film sheets, the **Division** selection list is empty.*



## *Image, text and graphic display*

The layout of the film sheet defines the number and size of the segments on a film sheet. In the **Film Preview** window and the **Filming** task card, you can change the aspect ratio of individual images in your segments and define whether and how text and graphics are to be printed or exposed on film.



- ◆ Click the **Images** subtask card into the foreground.

— or —

- ◆ Call up the **Film Properties** dialog box.
  - The settings of the currently selected images are displayed.
  - The dots in the radio buttons are displayed gray if the settings of the images are different.

### Changing the size of the segment



- ◆ Select an image, several images, or the entire film job.

- ◆ Click the **Fit to segment** button.

or

- ◆ Select **Fit to segment** in the **Film Properties** dialog box.

- The images are displayed as large as possible in the segment without any parts of the image being cut off.



### Changing the image section



- ◆ Click the **Clip document** button.

or

- ◆ Select **Clip document** in the **Film Properties** dialog box.
- Rectangular images can be increased so that the shorter side of the image fills the segment. Parts of the longer side of the image are cut off (upper and lower edge of the image or the sides of the image).



### Setting the original image



- ◆ Click the **Original Image** button.

or

- ◆ Select the **Original Image** option in the **Film Properties** dialog box.
- The images are displayed in the segment in their original size (max. 1% tolerance), the dimensions on the screen and on the printout are the original ones.



*If it is not possible to display images in the **Original Image** aspect ratio (1:1 scale), a message is displayed and the **Fit to segment** option is selected instead.*

## Showing/hiding text

In the film settings, you can select whether you want to have text information about the images printed/exposed.



*Image texts and patient names should not be hidden. Otherwise, printed images can easily be mixed up.*



- ◆ Click the **All text** button.

— or —

- ◆ Select the **All text** option in the **Film Properties** dialog box.
  - All text information about the images is displayed in the segments and later filmed or printed together with the images.



- ◆ Click the **No text** button.

— or —

- ◆ Select the **No text** option in the **Film Properties** dialog box.
  - All text information in the segments is hidden.



- ◆ Click the **Customized text** button.

— or —

- ◆ Select the **Customized text** option in the **Film Properties** dialog box.
  - Only part of the text information is displayed and exposed on film or printed.



*In the **Film Properties** dialog box, you can now select which text information is to be displayed if the **Customized text** option is selected.*

### Displaying/hiding graphics and annotations

You can have graphics (e.g. ROIs) and annotations displayed or hidden.



- ◆ Click the **Show Graphics** button.

— or —

- ◆ Select the **Show** option in the **Film Properties** dialog box.
  - The graphics (e.g. ROIs) and annotations are displayed.



- ◆ Click the **Hide Graphics** button.

— or —




- ◆ Select the **Hide** option in the **Film Properties** dialog box.
  - The graphics (e.g. ROIs) and annotations are hidden.

# Controlling data transfer

From the virtual film sheet the film jobs are transferred to the camera/printer. A queue of jobs waiting to be executed will be formed.

**Display in the status bar**

During the filming process, the status bar displays icons that tell you whether errors have occurred during filming.

Action	Symbol
Camera in operation	
Film exposure interrupted	
Output of warning messages	



*The status of the printer is not shown on the status bar.*

### *Viewing and manipulating film jobs*

The **Film Task Status** dialog window contains detailed information about the filming process. You can stop the entire queue, trigger it again and repeat or delete individual film jobs.

#### *Calling up the Film Task Status dialog*

- ◆ Select **Patient > Film Task Status**.

or

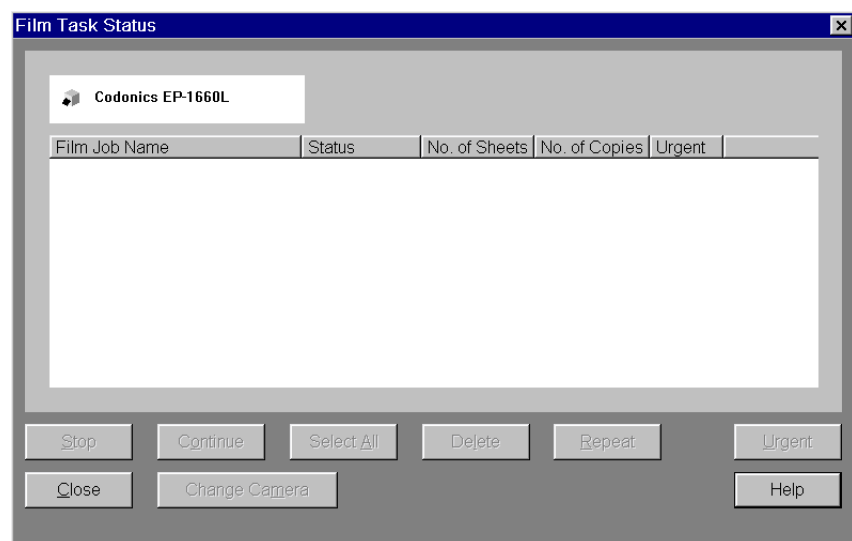


- ◆ Click the **Film Task Status** button.

or

- ◆ Click an icon for local data transfer in the status bar.

– The **Film Task Status** dialog box is displayed.





### Displaying the queue for a camera



- ◆ Click one of the camera icons.
- The queue of a camera is displayed.

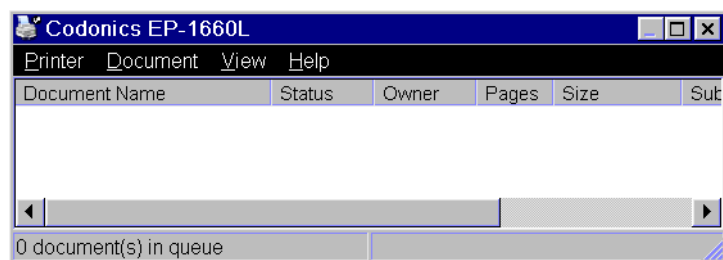


*The camera whose queue is being displayed is highlighted in a different color.*

### Displaying the queue of a printer



- ◆ Click on one of the printer icons.
- The print job control box is displayed. Here you can manipulate the print jobs for the selected printer by using the menu entries of the Windows XP operating system.



### *Manipulating film jobs*

The status of a job determines how you can influence its execution and therefore what buttons are active.



*Only film jobs sent to a camera can be modified in the **Film Task Status** dialog box.*

#### **Stopping jobs**

You can stop jobs with the "Queued" or "Printing" status at any time, for example to insert a new film.

- ◆ Select one or more jobs having the "Queued" status.

- ◆ Click **Stop**.

- All film jobs of this queue are stopped ("Stopped" status). In the job being filmed, a sheet that has been started will still be completed. All the following film sheets will not be processed.



Stop

#### **Resuming jobs**

Once your camera is ready again, you can resume execution of the queue.

- ◆ Select one or more jobs with the "Stopped" status.

- ◆ Click **Continue**.

- All the jobs in the queue return to their original status. Film exposure is resumed. The job that was being filmed when you clicked **Stop** is resumed at the point at which you stopped the camera.



Continue

### Repeating jobs

Film jobs that have been exposed and are therefore completed can be repeated while they are still in the queue.

- ◆ Select the required film job that has already been exposed on film and has the "Printed" status.

A rectangular button with a light gray background and a thin black border. The word "Repeat" is centered in a dark gray, sans-serif font.

- ◆ Click **Repeat**.

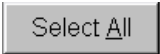
- The job is assigned the "Queued" status and is copied to the end of the queue.

### Deleting jobs

You can delete film jobs that are listed in a queue regardless of their status.

- ◆ Select one or more jobs.

— or —

A rectangular button with a light gray background and a thin black border. The text "Select All" is centered in a dark gray, sans-serif font.

- ◆ Click **Select All**.

A rectangular button with a light gray background and a thin black border. The word "Delete" is centered in a dark gray, sans-serif font.

- ◆ Click **Delete**.

- The selected jobs are deleted.

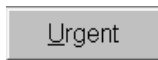


*If you delete a job that is being exposed, the sheet that has been started will still be completed, but none of the following sheets will be exposed on film.*

### Deleting the priority of film jobs

Film jobs that you want to process first can be classified as "urgent".

- ◆ Select one or more jobs with the "Queued" status.
- ◆ Click **Urgent**.
  - This job moves to the first position of all jobs with the "Queued" status.

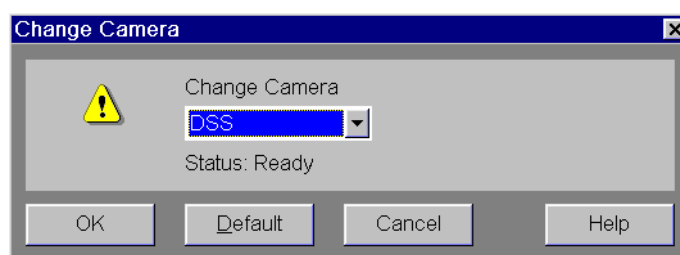


*If several jobs are classified as "urgent", they will be processed in the order listed.*

### Selecting another camera

You can select a new camera for one or more film jobs.

- ◆ Select one or more film jobs.
- ◆ Click the **Change Camera** button.
  - The **Change Camera** dialog window is opened.



- ◆ Select a new camera from the selection list.

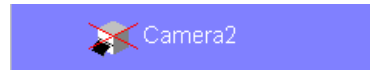


*You cannot redirect film jobs with the "Printing" status, i.e. jobs that are being processed, to another camera.*

*Redirecting film jobs from a camera to a printer is not possible.*

### Redirecting jobs from an inaccessible camera

You can redirect the queue or even individual film jobs for a camera that is defective or switched off to another camera.



- ◆ Click the camera icon.
  - The queue of the camera is displayed.
- ◆ Click the **Change Camera** button.
  - The **Change Camera** dialog window is opened.
- ◆ Select a substitute camera from the selection list.
- ◆ Close the **Change Camera** dialog box.
  - The queue of the camera is redirected to the substitute camera. The redirected queue is marked with the note "redirect" in the header of the dialog box.

### Canceling camera redirection



- ◆ Click the camera icon with the note "redirect".
  - The redirected queue is displayed.



- ◆ Click **Change Camera**.
  - The **Change Camera** dialog window is opened.



- ◆ Click **Default**.
  - The queue is now assigned to the original camera again. The original device designation is again displayed in the header bar of the **Film Task Status** dialog box.



*If you shut down the system before all the film jobs in a queue have been executed, the queue is not deleted. After rebooting the system, the film jobs are displayed in their old status again.*

## *Configuration for filming/printing*

You can adapt the filming and printing of images to your requirements in a flexible and individual way.

For this purpose two configuration windows for setting up the film function are available:

- ❑ In the **Filming Layout** configuration window, you can adapt the standard layout and create new layouts that are tailored to individual studies.
- ❑ In the **Filming Study Layout** configuration window, you can assign specific layouts to individual studies.

## *Calling up the configuration window*

The configuration window is called up from the syngo **Configuration Panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click the icon of the **Filming Layout** window.
  - The **Filming Layout** window is displayed.



Filming  
Layout

or



Filming Study  
Layout

- ◆ Double-click the icon of the **Filming Study Layout** window.
  - The **Filming Study Layout** window is displayed.

### *Configuring film layouts*

You can change and create film layouts using the **Film Task** and **Series** tab cards in the **Filming Layout** window.

#### *Selecting a layout*

In the **Filming Layout** configuration window, you can define the study-specific layouts.

In the **Layout name** selection list, you can specify which layout you want to change.

#### **Defining a study-specific layout**

During installation of your system, some study-specific layouts are also installed and assigned to individual studies or series.

This has the advantage that a suitable film layout is always used for these images.

You can adapt the default settings to your requirements by creating a new study-specific layout and assigning it to a study or changing an existing layout.



- ◆ Select the layout that you want to change.

or

- ◆ Enter a new name.
  - A new layout is generated.




*Your system can manage up to 100 layouts. If you attempt to create a 101st layout, an error message is displayed. You will then need to delete an existing layout.*

*(→ page 62)*




### Changing the standard layout

When creating a new layout, you can base it on the settings of the standard layout in the **Film Task** and **Series** tab cards and change it to meet your requirements.

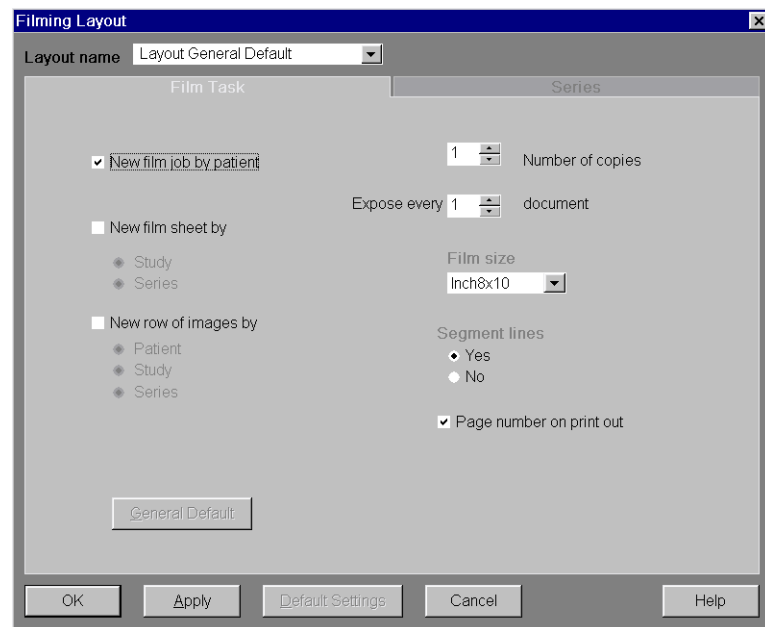
A rectangular button with a light gray background and a thin blue border. The text "General Default" is centered in a dark gray font.

- ◆ Click the **General Default** button.
- The standard settings are entered in gray in the radio buttons and check boxes of the corresponding tab cards. Settings that you have changed are shown black so that you can distinguish them from the default settings.

- 
- A gray rectangular box containing a list of radio button options. The first option is checked and is in black text. The other two are unchecked and are in gray text.
- ☒ New row of images by
    - ☐ Patient
    - ☐ Study
    - ☐ Series

### *Configuring film job settings*

On the **Film Task** tab card, you can define all the settings that determine the structure and execution of a film job.



### Determining a film job

- ◆ Select the **New film job by patient** option.
  - A film job contains only the images of one patient.

or

- ◆ Deselect the **New film job by patient** option.
  - Multiple film jobs are allowed.

### Selecting a new film sheet

- ◆ Select the **New film sheet by** option.
  - Empty rows in film sheets are permitted.
- ◆ Select an option, e.g. **Study**.
  - A new film sheet is started for each study.

### Selecting a new row in the film sheet

- ◆ Select **New row of images by**.
  - Empty fields in film sheets are permitted.
- ◆ Select an option, e.g. **Series**.
  - A new row is started in the film sheet for each series.

### Filming a partial selection

- ◆ Use the spin buttons to set whether every n-th image or all images (n=1) of a film job are to be copied in the virtual film sheet and therefore exposed/printed.

### Selecting the number of copies

- ◆ Define the number of copies.

### Selecting a film size

- ◆ In the **Film size** selection list, select the film size configured for the camera/printer.



*The entries offered depend on the cameras and printers.*

### Selecting segment lines

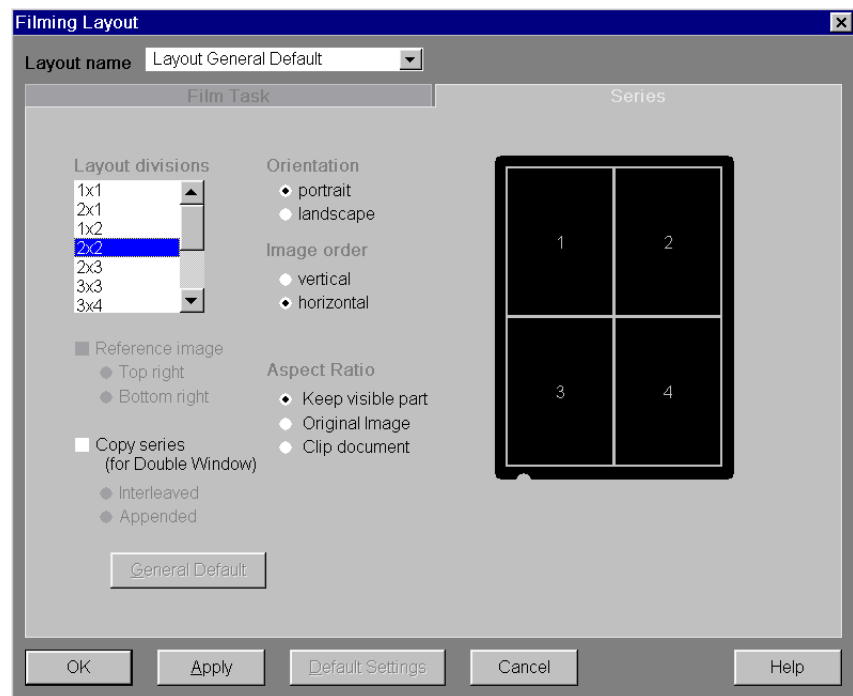
- ◆ Select the **Segment lines** option.
  - The images on the film sheets are separated by lines.

### Printing page numbers

- ◆ Select **Page number on print out**.
  - Page numbers are added to the printout.

## Configuring film sheets

On the **Series** tab card, you define the settings used for exposing or printing a film sheet.



### Select the film sheet division

- ◆ In the **Layout divisions** selection list, define the number of columns and rows of the film sheet.
- The division is shown in a diagram in the display window.

### Selecting the orientation

- ◆ Select **portrait** for exposing on film/printing on paper.
- or
- ◆ Select **landscape** for exposing on film/printing on paper.

### Selecting the image arrangement

- ◆ Activate the **vertical** option.
  - The images are arranged on the film sheet one after the other from top to bottom.

or

- ◆ Activate the **horizontal** option.
  - The images are arranged one after the other from left to right.

### Creating series with copy on film sheet

When transferring a series to the virtual film sheet, you can have a copy generated automatically and then process the copy before filming or printing.

- ◆ Click the **Copy series** option.
  - Copies of the series are generated.
- ◆ Activate the **Interleaved** option.
  - The copied series is inserted.

or

- ◆ Activate the **Appended** option.
  - The copied series is appended to the end.

### Selecting the display

- ◆ Activate the **Keep visible part** option.
  - The image is displayed in the segment with maximum size, without being cropped. This is the default.

or

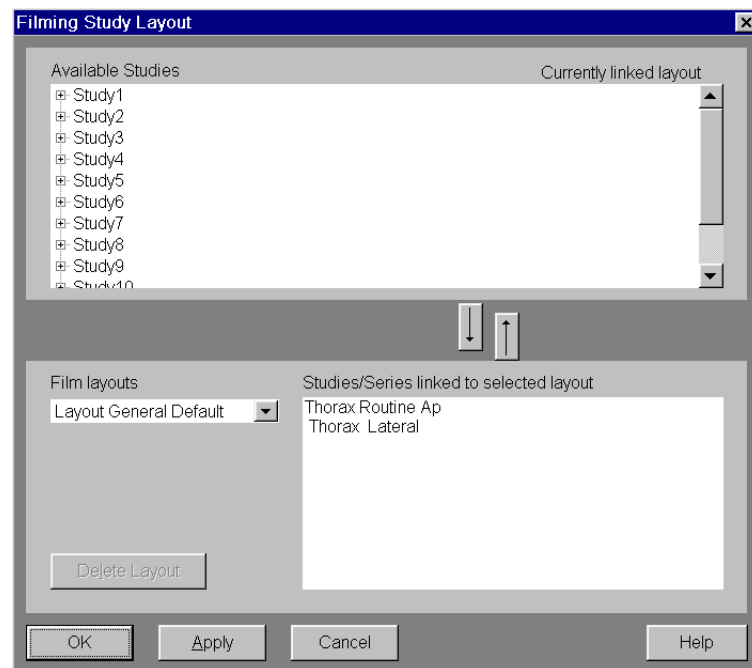
- ◆ Activate the **Original Image** option.
  - The image is displayed in its original size. Depending on the original size, the image might be cropped or displayed too small in the segment.

or

- ◆ Activate the **Clip document** option.
  - The image is enlarged so that it fills the entire segment. The overlapping edges are cropped accordingly.

### *Linking layouts to a study or series*

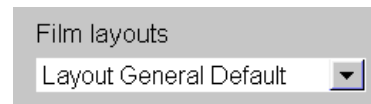
In the **Filming Study Layout** window, you can assign a specific layout to a study or series. This can either be a layout you have created yourself or a layout that was created by Siemens Service when your system was configured.



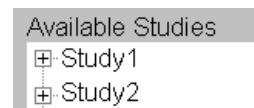


## *Assigning film layout*

You can assign a layout by selecting a study or series stored in your system and the layout required and then linking the two.



- ◆ Select the required film layout.



- ◆ Click the + symbol in front of a study.
  - The associated series are displayed.
- ◆ Click a series or study.
- ◆ Click the **down arrow** button.
  - The layout is assigned to the selected study or series.



### *Canceling a film layout assignment*

If you want to assign a different study-specific film layout to an study or series, you must first cancel the old layout assignment.

- ◆ Select the relevant study or series in the **Studies/Series linked to selected layout** list.



- ◆ Click the **up arrow** button.
  - The study/series is now assigned the standard layout again

### *Deleting a layout*



*Since your system can only store and manage up to 100 layouts, you should regularly delete those film layouts that you no longer require.*

- ◆ Select a layout that you no longer require from the **Film layouts** selection list.
- ◆ Click the **Delete Layout** button.
  - The entry is deleted from the list.



*You cannot delete the **standard layout**.*

## Introduction to archiving

After an examination or postprocessing, the images are stored in the local database.

This section explains how to save images and patient data from the local database and send them within the network, and how to export them to data media or through the network.

### Archiving data

Using the **Archive to** function, you can save patient and examination data to an archive via the network.



*You should archive patient and examination data as a routine at regular intervals.*

### Exporting data

The **Export to...** function allows you to write data to a removable storage medium (CD-R) for short-term storage or transfer.

If your system is connected to a network, you can send patient and examination data to other workstations using the **Send to...** function.

### Importing data from archive media

If you need archived data again at a later date, you can reimport them with the **Patient Browser**.

### Automatic data transfer

To make your working routine more effective, you can also have your patient and examination data automatically written to data media that you have defined, or sent to specific addresses in the network.

You can define the rules by and time at which automatic data transmission is to take place.

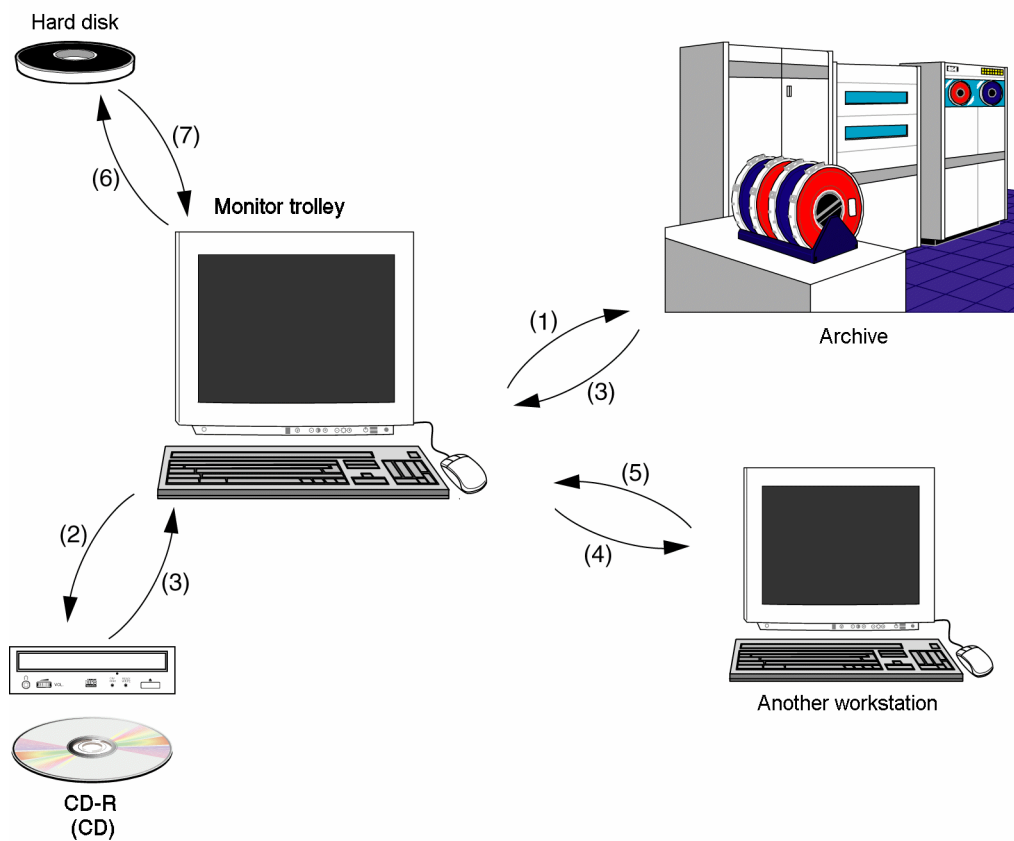
### Import/export in the file system

If you want to process or otherwise use images with other programs, you can export them to a specific directory on the system hard disk in several image formats (DICOM, bitmap) (**Export to Off-line**).

In the same way, you can import images in DICOM format to your application (**Import from Off-line**).

### *Transfer options*

The figure below shows the data backup and transfer options available to you.



- (1) Storing to the archive (**Archive to...**)
- (2) Exporting to CD-R (**Export to...**)
- (3) Importing from CD-R or from archive
- (4) Sending to other workstations (**Send to...**)
- (5) Receiving from other workstations
- (6) Exporting to a directory on the local hard disk (**Export to Off-line**)
- (7) Importing from a directory on the local hard disk (**Import from Off-line**)



*Please remember that not all transfer options may be available on your system. The drives and network nodes available depend on the individual configuration of your system and the options installed.*



*The hard disk of the image system is not suitable for long-term archiving of image or patient data.*

### Selecting data for transfer

Before you start transfer, select the relevant data objects.



*You can only archive, export, or send objects that are stored in the local database. If data are to be transferred from one data medium to another, they must first be imported into the main database.*

#### **Patient Browser**

If you want to archive or transfer patient or examination data, you usually select them from the local database of the **Patient Browser**.

#### **Task cards**

You can also select individual objects on the task cards to start transfer.

☐ **Viewing** task card

### *Calling up transfer functions*

You can call up archiving, data transfer within the network, and export and import either from a menu or from icon buttons.

#### **Transfer menu**

You can start archiving and transmission of data from the **Transfer** menu on the **Viewing** task card and in the **Patient Browser** window.

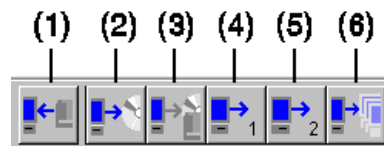


*Names such as **CD-R** and **Network/PACS** are only examples of drive and network names. The names actually used depend on the configuration of your system.*

#### **Buttons**

Depending on your configuration, you will find different buttons for starting transfer quickly and easily in the control area of your task cards.

You will also find a series of icon buttons in the toolbar of the **Patient Browser** with which you can start transfers.



- (1) Importing data
- (2) Storing data to a specified default CD-R
- (3) Storing data to a selectable local data medium (CD-R)
- (4) Sending data to the first default network destination
- (5) Sending data to the second default network destination
- (6) Sending data to a selectable network destination

#### **Key**



You can also start transfer to the first default network destination with the **Send to default Node 1** key on the symbol keypad.

## *Archiving data*

The menu item **Archive to...** is used to copy selected patient and examination data to archive media. For this, an archive server may be set up via the network. You can import archived data back to your local database whenever you need them.

### *General safety information*

When archiving or sending data, an acknowledgement of receipt is sent from the destination address back to your computer ("Storage Commitment"). In the **Patient Browser**, this status is shown by flags for the relevant data objects.

The following "Storage Commitment" flags are used:

- ☐ **AC**  
Archived and committed
- ☐ **SC**  
Sent and committed

However, the markers do not confirm successful long-term archiving on the receiver side.

---

#### **CAUTION**

Misleading/misinterpretation of the AC/SC flags. The AC/SC flags indicate receipt and storage of data on hard disk on the receiver side.

#### **Loss of data within the required period for retention!**

- ◆ Observe the regulatory requirements regarding the archiving procedure.
- 

---

#### **CAUTION**

Damage or illegibility of CD-R media used for data storage.

#### **Loss of data!**

- ◆ Local media should be configured and used as archive media only if the manufacturer has approved the media for archiving purposes.
  - ◆ Check whether the data are legible before deleting them from the local database.
-





*There are regulative (statutory) regulations governing the archiving period, data availability, and data security (data integrity, incorruptibility), and recommendations concerning fire protection or water damage for the archiving of image data. The operator of the archive is responsible for compliance with these requirements.*



*Because of constantly advancing technical developments, it might not be possible to implement storage and access for the required archiving period with a single storage technology and type of medium. Hence, migration of data may therefore be necessary under the responsibility of the operator of the digital archive.*

### *Archiving in the network (option)*

If your system is connected to a central archive, use it to archive your patient and examination data (only DICOM option).

The following information is of relevance for archive nodes:

☐ **Destination**

Name of the archive

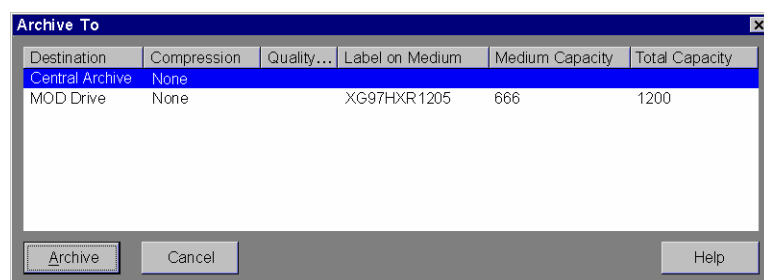
☐ **Compression**

Method by which data are compressed.

☐ **Quality factor**

Quality factor, with which data are compressed.

- ◆ Select the data that you want to archive.
- ◆ Select **Transfer > Archive to....**
  - The **Archive To** dialog box is displayed. The available archive nodes and drives are displayed.



- ◆ Select the required archive from the list.
- ◆ Click **Archive** to transfer the data to the selected archive.



## *Exporting data*

Unlike the archiving function, the export function does not check for previous archiving processes, flags or the work status. In addition, data are not marked as archived, but only as exported.

## *General safety information*

---

### **CAUTION**

When you read data from a device and simultaneously export data to the same device, one job or both jobs can fail (depending on the timing).

#### **Loss of data!**

- ◆ When exporting or storing data to a local storage medium (CD, MOD, DVD-RAM), do not try to read from the same medium in parallel, since this may stop the current export job and even damage the export medium. If you have stored data on the export medium in multi-session mode, these data may also become unreadable.
- 



*To minimize the risk of data loss, use only CD-Rs approved by Siemens. CD-Rs are available through your Siemens representative.*



*While data are being written to CD-R, the ARCADIS Avantic must not be shut down and the monitor trolley must not be disconnected from the C-arm system.*



*You cannot release radiation during the CD-R write process. It is recommended that you start the write process only when no examination is being performed.*

## Backup on local data media

Depending on the routine you use, one or several drives for external data media (CD-R) will be connected to your system.



*In **Transfer Configuration**, you can define how the data of a patient are to be written to a medium (memory utilization and compression).*

### Data medium

The system supports the following storage medium types:

- ☐ CD-R (CD Recordable)



*Data are archived to a central archive via the network. The archive can use other data media.*

### Handling of data media

Please follow relevant manufacturer's instructions when handling and storing CD-Rs.

### Drives

Your system comes with a CD recorder for data storage.

### *Inserting and ejecting media*

In order to export data, you must insert a suitable CD-R in the correct drive.

#### **Inserting a CD**

CDs can be written to on one side only.

- ◆ Press the eject button on the drive.
- ◆ Place the CD in the drawer with the label facing up.
- ◆ Press the eject button on the drive again.
- The drawer with the CD is retracted.

#### **Ejecting a CD**

To eject a CD from the drive, always use the **Transfer** menu in order to avoid accidental interruption of the write process.

- ◆ Select **Transfer > Eject from CD/RW**.
- The drawer with the CD is ejected.

### *Storing to multi-session CD-R*

As your system is configured for multi session, you can store your data to new, unrecorded CD-Rs, or CD-Rs that have already been written to once or several times. The other data on the CD-R are not lost, the new data are simply added.

#### **DICOM Viewer**

In the first session, a DICOM viewer is written to the CD together with the image data. This allows you to view the images stored on the CD on any computer. The DICOM viewer is started directly from the CD; no files are installed on the computer.

#### **Selecting data**

You will normally export the data to CD-R from the **Patient Browser** where you can simply select the required data objects.

---

### **CAUTION**

Write error during the recording of additional sessions on the medium in multi-session mode.

**Previously stored data and data of the current session can no longer be read!**

- ◆ Do not delete the data stored on a medium from the local database until you have successfully finalized the medium and verified the legibility of the data.
  - ◆ Please note that CD-Rs are not suitable for long-term archiving.
- 
- ◆ Make sure that the correct CD-R is in the CD recorder.
  - ◆ Open the **Patient Browser**.
  - ◆ Select the patient, study, series or images you want to store on CD-R in the navigation or content area.

### Writing data to a CD-R

- ◆ Select **Transfer > Export to ...** in the menu.

— or —



- ◆ Click this button.
  - The selected data are written to CD-R.
  - The CD is automatically labeled with the date and time.



*If the patient data are not yet complete, a corresponding message is displayed.  
Enter the missing data in the **Correct** dialog.*



#### **Insufficient memory available**

If the memory capacity of the CD-R is not sufficient, the message **Not Enough Space on CD medium** is displayed.

- ◆ If you want to change the CD-R (for example, to insert a new, unrecorded CD-R), click **Eject**.



## *Sending patient data in the network (option)*

If your system is connected to and configured in a network, you can select patient and examination data from your local database and send them to other users in your DICOM network whenever necessary.

### *Sending data to a standard address*

During installation, Siemens Service can configure various network nodes (e.g. **Node 1** and **Node 2**) as standard addresses in the network.

- ◆ Select the data that you want to send.
- ◆ Press the **Send to Node 1** key on the symbol keypad.



or



- ◆ Select **Transfer > Send to Node 1** or **Transfer > Send to Node 2**.
- or —
- ◆ Click the relevant button.
- The data are sent to the selected address.

### *Sending data to other addresses in the network*

If you want to send data to addresses other than the standard addresses or to more than one user in the network simultaneously, select the network node(s) from a list.

◆ First select the data that you want to send.

◆ Select **Transfer > Send to...**

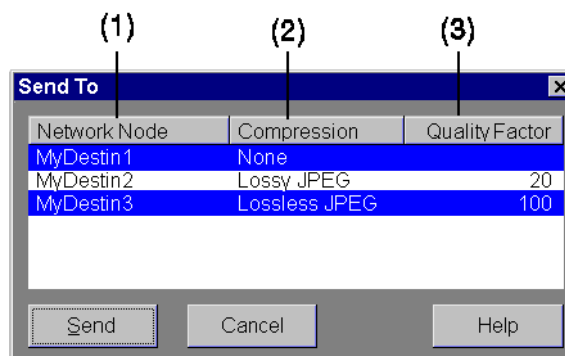
— or —



◆ Click this button.

– The **Send To** dialog box is displayed with a list of all available network addresses.

—



(1) **Network Nodes**

–Name of the network node (receiver name).

(2) **Compression**

–Compression method by which the data are prepared for faster transfer.

(3) **Quality Factor**

–The quality factor states the image quality of the compressed data compared with the original data.

◆ Select one or more network nodes.



◆ Click **Send**.

– The selected data are sent to the required address(es).

## *Import/export in the file system*

If you want to use and process images on other devices, too, you can copy them from the local database to a directory on your hard disk or on a remote computer, and import them from there.

### **Image formats**

The following formats are supported for exporting:

- ☐ DICOM format (\*.ima)
- ☐ Windows Bitmap (\*.bmp)

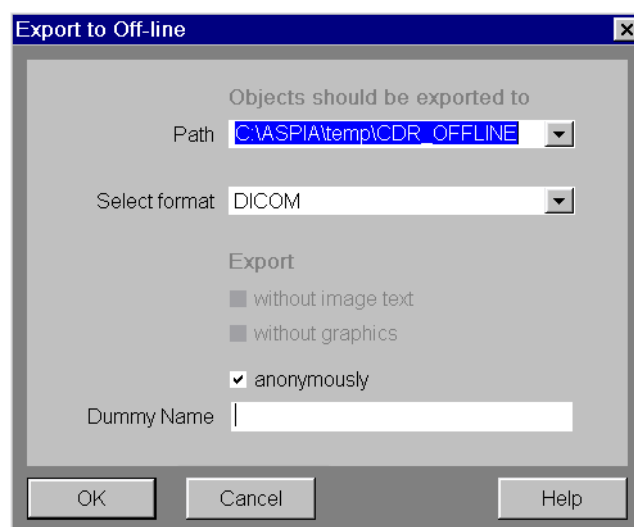


*Importing images is only possible in DICOM format, not in Windows bitmap or AVI format.*

## *Exporting images to the file system*

### **Calling up the export dialog**

- ◆ Select the required images.
- ◆ Select **Transfer > Export to Off-line**.
- The dialog box **Export to Off-line** is displayed.



### **Selecting the path**

- ◆ Select the required drive and directory from the selection list **Path**.
- ◆ Extend the path, if necessary.



*To select or create a subdirectory, add the subdirectory path to the prompted path separated by "\" (up to 8 subdirectory levels are possible from the root directory).*

*You can also select a directory on another computer in the network. In this case, you must enter the path as "\\computer\_name\directory".*



*Please make sure that the names of new directories and subdirectories do not contain blanks.*

*Do not use any of the following characters: ^ = \*

## Selecting an image format

- ◆ Select the required image format from the selection list **Select Format**.

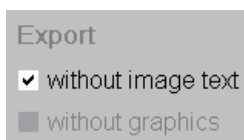


*Depending on the image type in question, images are exported with 8 bit/256 gray scales or 24 bit/RGB.*

*If you have selected a multiframe image in the **Patient Browser**, only the representative image in bitmap format is exported. In the Viewing task card you can select the individual images explicitly.*

*Be aware that files of the C:\Temp\CDR\_OFFLINE directory exceeding the CD-R's capacity are deleted when the **Record Off-line Files** function has been successfully performed.*

## Selecting image text/graphic



- ◆ Check the corresponding check boxes.

- The image text and the graphic are "burnt into" the image and exported with it.

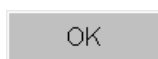


*If you have selected DICOM format, the image text and the graphic is also exported as it is included in DICOM format, i.e. Export functions in the dialog window are disabled.*

## Export anonymously

- ◆ Click on the **anonymously** checkbox.
- ◆ Enter the name under which to store the data in the **Dummy Name** field.

## Starting export



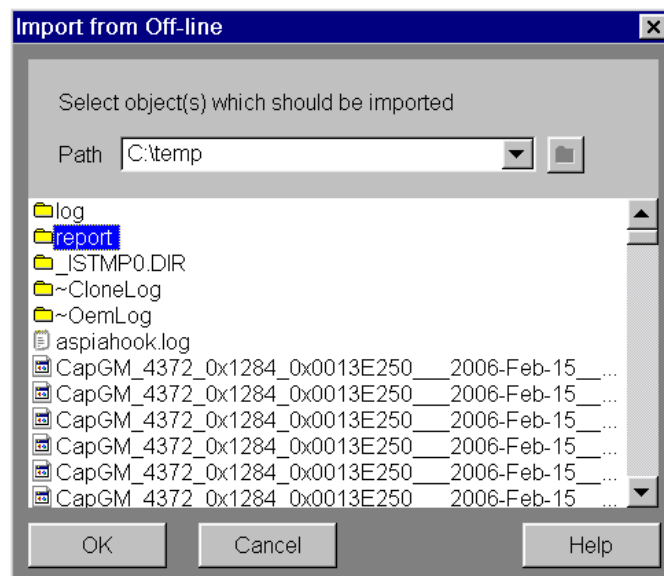
- ◆ Confirm by clicking **OK**.
- The selected image data is stored as individual files.
- File names are created according to the following scheme: Last name of the patient.modality.study description.serial number.image number.times-tamp.internal number.image format
- The timestamp follows the following format: yyyy.MM.DD.hh.mm.ss.dddddd

## *Importing images from the file system*

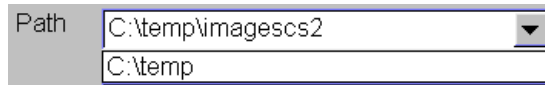
You can read in individual images from specific released directories of the system hard disk or read them into your local database across the network.

### **Calling up the import dialog**

- ◆ Select **Transfer > Import from Off-line**.
- The dialog box **Import from Off-line** is displayed.



## Selecting files



- ◆ Select the required drive and directory from the selection list **Path**.

— or —



- ◆ If necessary, navigate through the directory tree by double-clicking on a folder and using the "higher-level folder" button.



*All directories starting with the configured root directory are accessible.*

- ◆ Enter a file name.



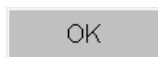
*You can specify several files at once using the wildcard "\*".*

or

- ◆ Select the file(s) in question from the directory.



*You can select several files at once with the left mouse button using **Shift** and **Ctrl**.*



- ◆ Confirm by clicking **OK**.

or

- ◆ Double-click the relevant file.
- The selected image files are imported into your local database.

### *Recording off-line files onto CD*

All images in bitmap format, exported previously to a specific directory, can be recorded automatically on CD-R. The path of this directory can be configured in service mode. The default setting for this path is C:\ASPIA\temp\CDR\_OFFLINE.

#### **Recording files**

- ◆ Select **Transfer> Record Off-line Files** in the main menu.
- Recording is started in single session mode.



*Note that the CD-R and the **Local Job Status** clipboard must be empty.  
Recording can be started only after all jobs have been deleted from the clipboard.*



*During the recording process it is not possible to copy files to the source directory.*

#### **Deleting files**

- ◆ All recorded files will be deleted from this directory after recording on CD-R is completed.







## Controlling data transfer

All the jobs for archiving, sending or exporting data are executed one after the other ("Queued").

You can classify one network job as urgent, stop jobs, repeat jobs or delete jobs to influence how the queue is executed.

### Display in the status bar

During data transfer, icons are displayed in the status bar which tell you what operation is currently being executed or whether an error has occurred in at least one job.

Action	Not active	Active	Fehler
Storing/Exporting/ Importing on data medium	no icon		
Sending/Archiving / Receiving in the network	no icon		



*If an error occurs during data transfer, an error message appears on the status bar together with the appropriate icon.*

### Viewing jobs

The **Local Job Status** dialog box informs you about storage jobs and the export and import of data to or from your CD-R drives.

In the **Network Job Status** dialog box, you can obtain information about jobs for data exchange through the network.



*If your system is closed down during an archiving job, the number of remaining images displayed in the Job Status dialog boxes may be incorrect when you restart the system.*

*Jobs with the status "Error", "Receiving" (or active import jobs), or "Spooling" are no longer displayed after a restart.*

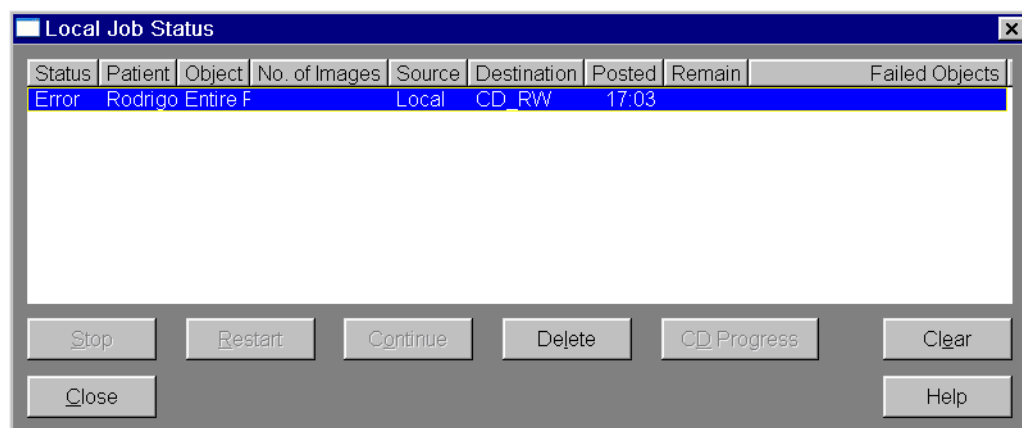
### Calling up local jobs

- ◆ Select **Transfer > Local Job Status**.

or



- ◆ Click an icon for local data transfer in the status bar.
- The **Local Job Status** dialog box is displayed.



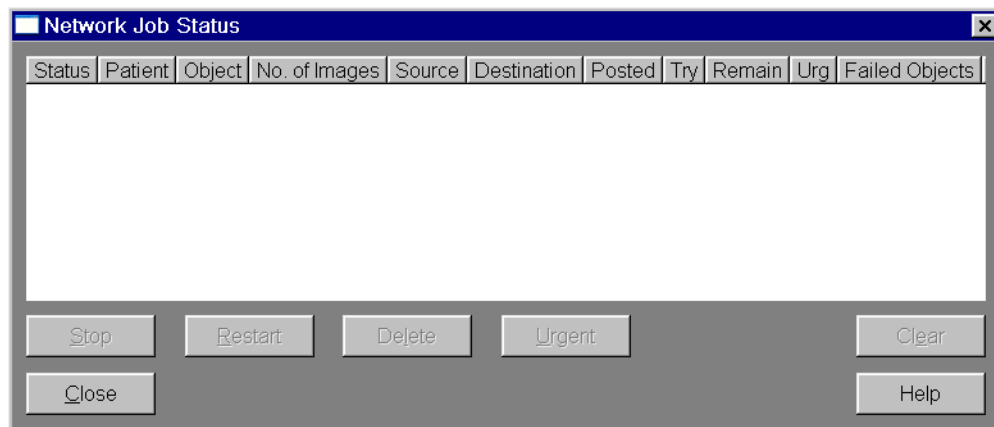
### *Calling up network jobs*

- ◆ Select **Transfer > Network Job Status**.

or



- ◆ Click on an icon for data transfer in the network on the status bar.
  - The **Network Job Status** dialog box is displayed.



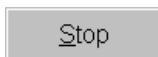
### *Manipulating job performance*

The steps that you can perform in the **Local Job Status** and **Network Job Status** dialog windows and therefore the buttons that are active depend on the status of a job

#### **Stopping jobs**

Jobs with the status "Active", "Retry" and "Queued" can be stopped at any time, for example, if you want to change the CD-R before processing the jobs.

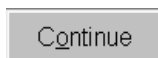
- ◆ Select one or more jobs having the "Queued" status.
- ◆ Click **Stop**.
  - The selected jobs and all other queued jobs with the same destination address are now no longer started automatically.



#### **Resuming jobs**

Jobs with "Stopped" or "Failed" status can be resumed at the point at which they were stopped (only for archive and import processes listed in the **Local Job Status** window).

- ◆ Select one or more jobs with "Stopped" or "Failed" status.
- ◆ Click **Continue**.
  - Jobs with the same destination address as the selected jobs are also resumed.



### Restarting jobs

If you have stopped jobs or if errors occurred in jobs, you can start them again from the beginning. You can also repeat a job that has already been completed.

- ◆ Select one or more jobs with "Stopping", "Stopped", "Failed" or "Completed" status.

A rectangular button with a light gray background and a thin blue border. The word "Restart" is centered in a dark gray font.

- ◆ Click **Restart**.

- The jobs are restarted, their status is now "Active" or "Queued".

### Deleting jobs

You can delete jobs that are listed in the job status windows, provided they do not have the status "Receiving", "Recording" or "Spooling".

A rectangular button with a light gray background and a thin blue border. The word "Delete" is centered in a dark gray font.

- ◆ Select one or more jobs.

- ◆ Click **Delete**.

- These jobs will no longer be executed and they will be removed from the job list.



*For technical reasons, large jobs will remain in the job list for a while with "Deleting" status even after they have been deleted. Do not restart or continue such a job.*

### Changing priority

Send jobs that are to be processed first are classified as "urgent" in the **Network Job Status** dialog box (no more than one job per destination address).

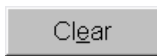
- ◆ Select one send job that is to be executed first.



- ◆ Click **Urgent**.
  - The send job in the queue is then started immediately after the active jobs.

### Clearing a job list

Entries having the status "Completed", "Received", or "Error" can be removed from the job list.



- ◆ Click **Clear**.
  - The jobs are removed from the job list.

---

## *Configuration for archiving*

In the **Transfer Configuration** window, you can define how store, export and send jobs are executed by your system.

You can make or change the following settings here:

- ☐ Automatic storing and sending of examination data
- ☐ Compression of data during storing, export and sending
- ☐ Work status required for storing data and storage capacity on data media

## *Calling up configuration windows*

You can call up the configuration window from thesyngo **Configuration panel**.

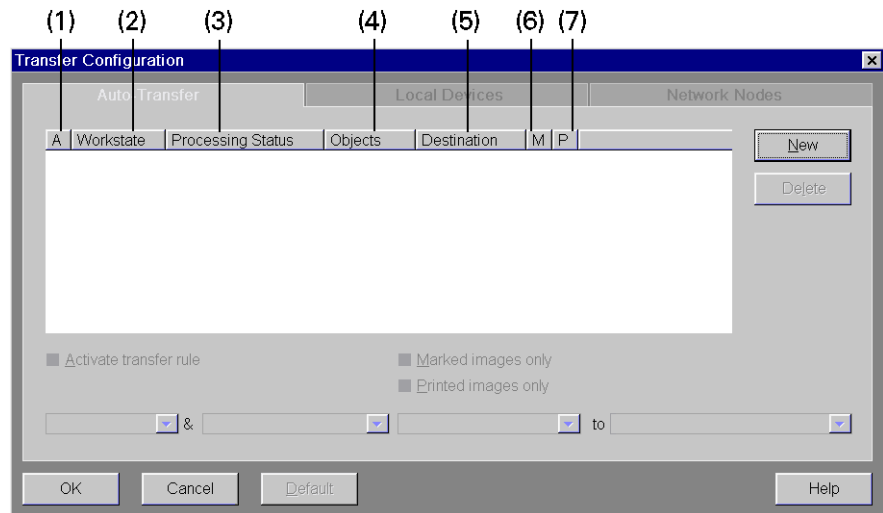


Transfer

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click on the icon of the **Transfer Configuration** window.
- The **Transfer Configuration** window is displayed with the **Auto Transfer**, **Local Devices** and **Network Nodes** tab cards.

### Automatic data transfer

On the **Auto Transfer** tab card, you can define whether and by what rules patient and examination data are automatically stored or sent in the network.



- (1) **Active**  
A checkmark in the column indicates that this rule is currently being applied.
- (2) **Workstate**  
The data selected for transfer that have reached the specified work status are automatically stored or sent in the network.
- (3) **Processing Status**  
Data that have reached the status stated here are automatically stored or sent via the network.
- (4) **Objects**  
Here you can see to what kind of data the rules refer (i.e. individual images, series ...).
- (5) **Destination**  
In this column, you can see to which drive or to which network address the data are automatically transferred.
- (6) **Marked**  
A checkmark in this column indicates that only marked data are automatically transferred.
- (7) **Printed**  
A checkmark in this column indicates that only printed data are automatically transferred.



*When emergency registration is performed, automatic data transfer is deactivated (indicated in the status bar). After normal registration, automatic data transfer is reactivated.*



## Creating and editing rules

Underneath the list with existing rules for automatic data transfer, you will find input fields in which you can edit the rules or create new rules. You can create up to ten rules.

### Selecting rules

A	Workstate	Processing Status	Objects	Destination	M	P
Read	*		Images	CD RW	✓	✓
✓ Completed	Archived		Series	Ward		

- ◆ Select a rule for editing from the list.

or

- ◆ Click on **New** to create a new rule.



### Creating rules

You can create a rule for automatic data transfer by combining attributes from the selection lists.

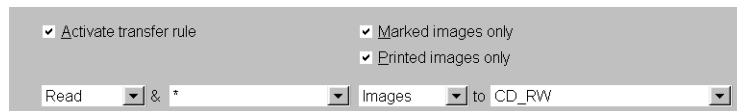


*The selection list contains the following special entries:*

*Selecting None in these selection lists means that an auto transfer route is valid if the according attribute is empty.*

*Selecting Don't care means that the status is not relevant to the rule and changes will not be considered.*

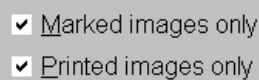
*Selecting \* means that any change of the corresponding attribute invokes an auto transfer job.*



- ◆ Select the work status to be reached (max. 2), the data type and the destination address from the selection lists.

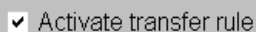


*Automatic data transfer should always be configured at the instance level.*



- ◆ Check the **Marked** and **Printed** checkbox.
  - Only marked and/or only filmed/printed images are used.

### Activating rules



- ◆ Click on the **Activate transfer rule** check box.
  - The selected rule is active and used for starting automatic data transfer jobs.

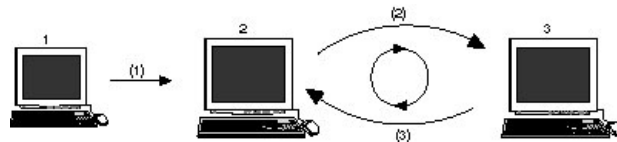


*Please note that you can also assign the "completed" status manually in the **Patient Browser** and thus initiate automatic data transfer, if necessary.*

## Infinite loops

Make sure that you do not create any infinite loops with rules!

Here is an example of an unfortunate configuration with an endless loop:



- (1) Computer 1 sends data to computer 2.
- (2) Rule on computer 2: Send all data received to computer 3.
- (3) Rule on computer 3: Send all data received to computer 2.

As soon as computer 2 receives data for the first time, these data are sent back and forth in a loop between computers 2 and 3.

## Deleting rules

You can delete rules that you will no longer need for data transmission in the future instead of just deactivating them.

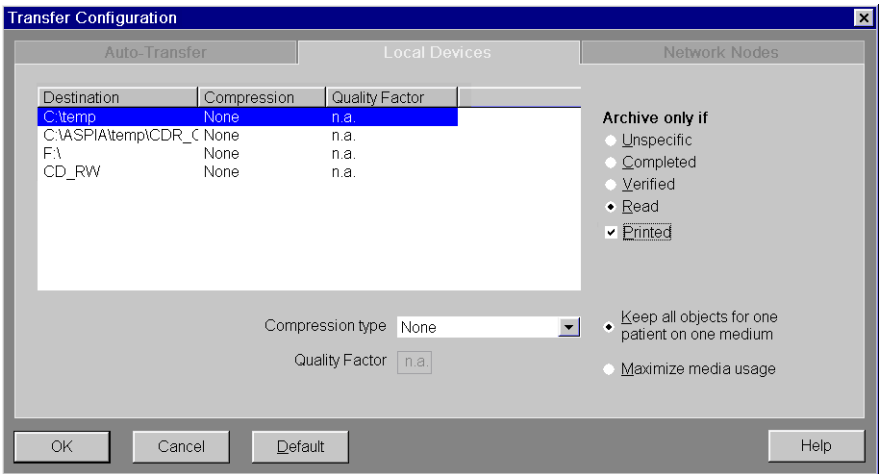
A	Workstate	Processing Status	Objects	Destination	M	P
	Read	*	Images	CD_RW	✓	✓
✓	Completed	Archived	Series	Ward		

- ◆ Select the rule that you want to delete from the list.
- ◆ Click **Delete**.
  - The rule is removed from the list.



# Local Devices

On the **Local Devices** tab card, you define the default settings for storing and exporting data on the data media.



### *Defining the use of storage capacity*

If you require more than one data medium for storing or exporting, you can define whether the data of one patient can be distributed over two data media or not (if possible).

- ☒ Keep all objects for one patient on one medium
- ☐ Maximize media usage

◆ Click on the option field **Keep all objects....**

- The data of one patient are always stored contiguously on one data carrier.

or

◆ Click on the radio button **Maximize media usage.**

- The examination data of one patient are distributed over two or more data media. This will make optimum use of the storage capacity of the data media.



**Keep all objects for one patient on one medium** *only ever applies to one job.*

### *Setting data compression for storing*

Patient and examination data can be stored or exported compressed or uncompressed.

Data that has been compressed before transfer takes up less storage space and is transferred more quickly. When reimporting data into your local database, compressed data is automatically decompressed.



*Images that have been stored compressed with loss of quality in your database, can only be stored with the same quality factor.*

---

### CAUTION

Compression method is set to irreversible compression (Lossy JPEG).

**Information of medical relevance may be lost.**

- ◆ Do not use lossy compressed images for primary diagnosis, the image quality may not be sufficient.
- 
- ◆ Select a drive for which you want to define data compression.

Compression type

- ◆ Select under **Compression type** whether and how the data is to be compressed.

Quality Factor

- ◆ State under **Quality Factor** (1-100%) the remaining image quality in % as compared with the original material.



*The quality factor can be specified only in the **Lossy JPEG** setting. Which quality factor is acceptable to you will depend on your requirements.*

*JPEG compression is indicated in the image segment (it is not indicated if **No Text** is selected).*

### *Defining the work status for storing*

Here you can select the work status that patient and examination data must have reached before storing. If this work status is not reached, a warning will be displayed before data transfer starts.



Archive only if

- ☐ Unspecific
- ☐ Completed
- ☐ Verified
- ☐ Read
- ☒ Printed

- ◆ Use the radio buttons to define the work status required as a prerequisite for storing.



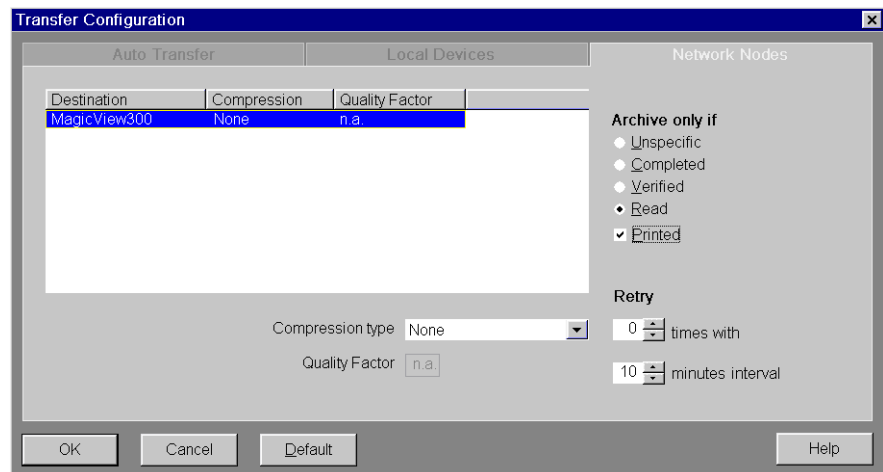
*The **Verified** and **Read** options apply to the study and series levels only.*

*If you select the **Unspecific** option, you can store data of any work status without confirmation.*

- ◆ Click on the **Printed** check box, if necessary.
  - Images must have been printed/filmed at least once before they are stored.

## *Network nodes (option)*

On the **Network Nodes** tab card, you can define the default settings for sending data in the network. You can specify a type of compression and a quality factor and rules for repeated send attempts and the work status for the network address.





### *Setting data compression for sending*

Similar to storing or exporting data on external data media, you can activate data compression for sending patient and examination data through the network (depending on the configuration of your system).

---

#### **CAUTION**

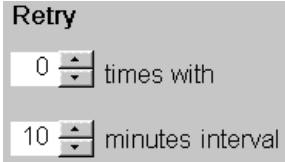
The compression method is set to irreversible compression (Lossy JPEG).

##### **Information of medical relevance may be lost.**

- ◆ Do not use lossy compressed images for primary diagnosis, the image quality may not be sufficient.
- 
- ◆ Specify the individual network addresses, the compression type and quality factor.  
(→ page 98)

### *Setting retries*

If errors occur during data transmission in the network, they can often be remedied by a repeated attempt. You can set how many times and at what interval attempts are to be repeated.



Retry

0 times with

10 minutes interval

- ◆ Enter the number of retries or click on the arrows. (Possible values: 0 to 5; default: 0)
- ◆ Enter the time interval between retries. (Possible values: 5 to 60 min; default: 10 min)
- The number of retries is displayed in the **Network Job Status** dialog.

### *Defining the work status for sending*

Here you can select what work status patient and examination data must have reached in case of sending. If this work status is not reached, a warning is displayed before sending.



**Archive only if**

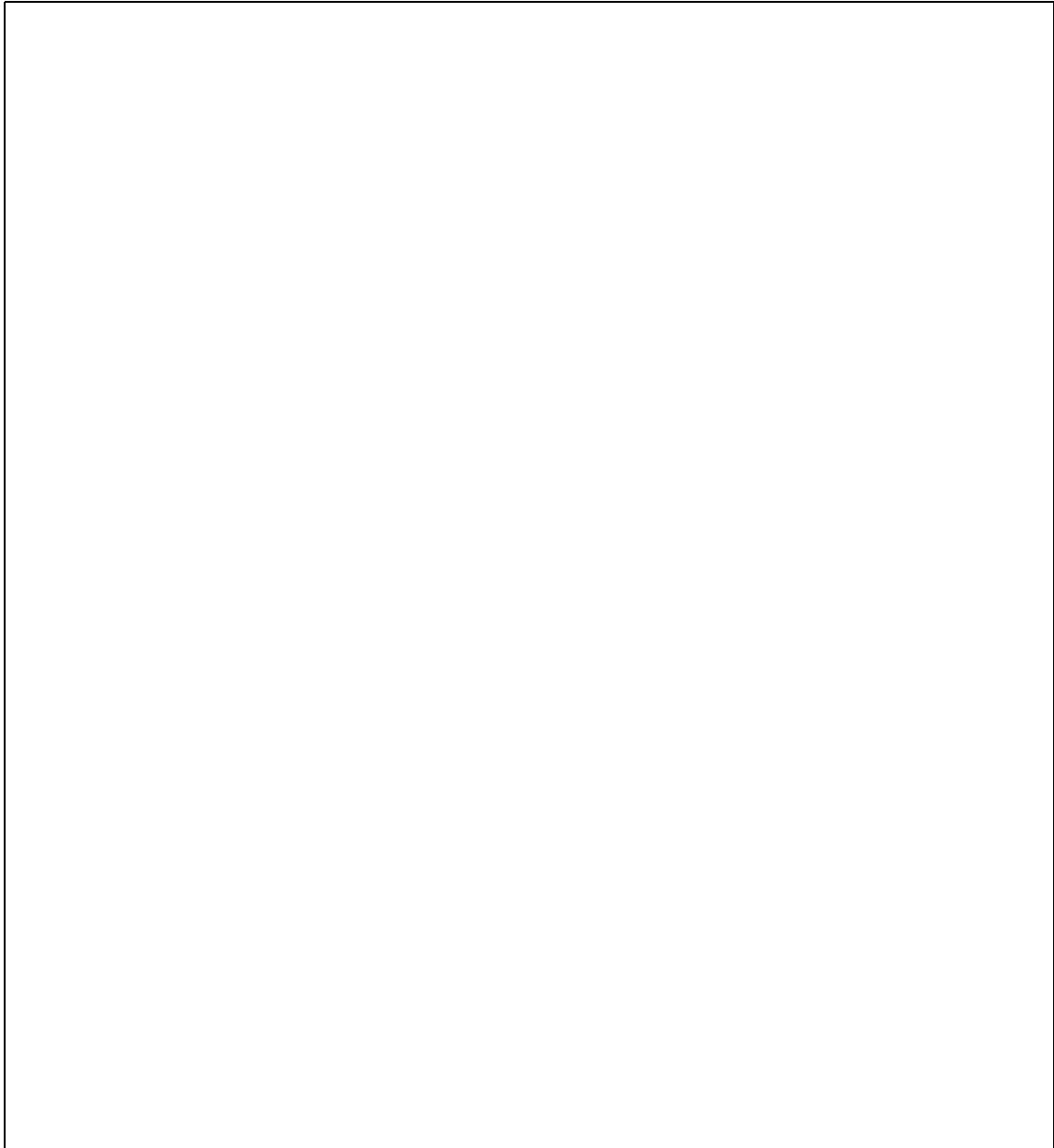
- ☐ Unspecific
- ☐ Completed
- ☐ Verified
- ☐ Read
- ☒ Printed

- ◆ With the radio buttons, define the work status required for sending.  
(→ page 99)

**SIEMENS**

**Operator Manual  
ARCADIS Avantic  
Configuration**

**SP**



Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

## Examination configuration

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## *Examination configuration*

It is generally not necessary to set examination parameters and thus configure exam sets, since the default standard programs delivered with the system already cover a large spectrum of dedicated applications.

If you wish to configure your own examination sets nevertheless, you can make the parameter settings in the **Examination Set Configuration** dialog window.

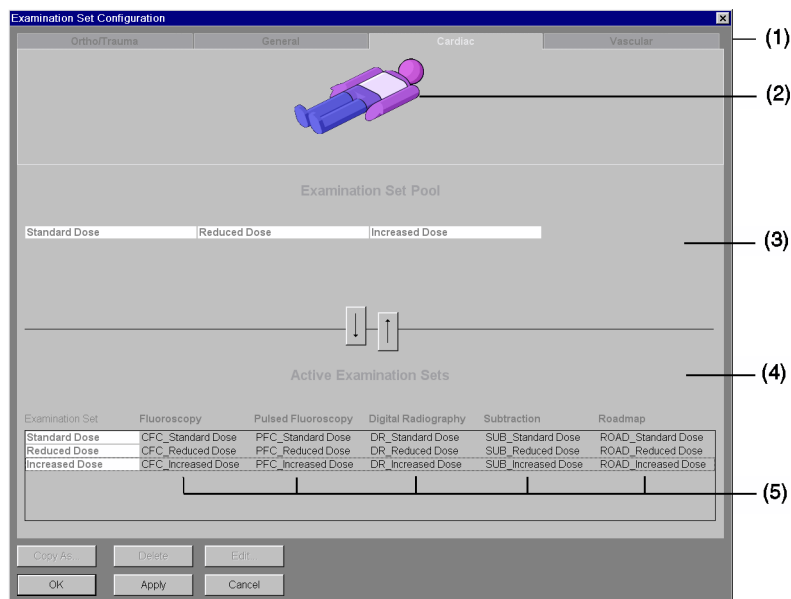
Basically there are two different configuration possibilities:

- ❑ Administration (activating, deactivating, creating and deleting) of *exam sets*. Thus you define the choice of exam sets that are available to you in the selection lists in the control area of the **Examination** task card. These settings are made directly in the **Examination Set Configuration** window.
- ❑ Modifying system-specific parameter of *operating programs*. Thus you can define in detail the acquisition parameters of the exam set to which the relevant operating program belongs. These settings are made in special tab cards that can be called up for the corresponding exam set from the **Examination Set Configuration** dialog.

## Calling up / closing the configuration window

You can call up the configuration window from the syngo **Configuration Panel**.

- ◆ Select **Options > Configuration** in the main menu.
- ◆ Double-click this button.
- The **Examination Set Configuration** window appears.



- (1) Medical application field
- (2) Virtual patient anatomy (VPA)
- (3) Area of available examination sets
- (4) Area of active examination sets
- (5) Operating programs with the parameter settings specific to the examination set in the individual operating modes



### Applying changes

If you have changed the settings of the examination sets, you must confirm your entries.



- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.

or



- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog is closed.
- The changes you made in the examination settings are automatically applied to the next examination.

### *Examination sets*

The examination sets are assigned to medical application fields. Within each application they are also assigned to special body regions. You will find the same assignment pattern on the **Examination** task card.



*Medical application fields can additionally be licensed by options. The medical application field 'Vascular', for instance, is tied to the 'DSA/Roadmap' option. If the option is not activated, the **Examination Set Configuration** will not contain a configuration card for this option, and the application field cannot be selected in the **Examination** task card.*

### *Selecting examination program sets*

When editing examination sets, first select the medical application area and afterwards the body region.

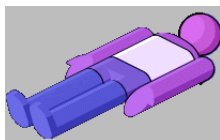
#### **Selecting the medical application area**

Each medical application field is represented by a tab card in the **Examination Set Configuration** dialog window.

- ◆ Click on the tab of the required medical application field.
- The selected tab card is placed in the foreground.

## Selecting body regions

Within a medical application field, the following body regions (and only these) can be selected: " Head", " Body trunk" (Thorax, Ventral region, Cervical spine, Thoracic spine), " Pelvis" (Pelvis, Lumbar spine, Hip), " Upper limb", " Lower limb".



- ◆ Click the required body region in the " Virtual Patient Anatomy".
  - The activated body region is highlighted.
  - In the lower area of the **Examination Set Configuration** dialog window, the examination sets which are especially designated for this body region are displayed.



*A medical application field does not necessarily contain examination sets for all indicated body regions. The assignment of body regions depends on the medical application field.*

## Available/active examination sets

The examination sets are listed in the **Examination Set Pool** and **Active Examination Sets** areas.

### Examination set pool

The area of available examination sets consists of all programmed examination sets that are stored in the ARCADIS Avantic, but have not necessarily been activated.

### Active examination sets

The area of active examination sets consists of all programmed examination sets stored in the ARCADIS Avantic that have been activated. These are thus available in the selection list of examination sets in the **Examination** task card.

### Activating exam sets

You can activate further examination sets by moving them from the selection pool to the active pool.

- ◆ Click an examination set in the **Examination Set Pool** area.
- ◆ Click this button.



or

- ◆ Drag the examination set into the **Active Examination Set** list using the mouse.

### Changing the sequence

The sequence of examination sets in this list of active programs defines the sequence in which they appear in the selection list of the **Examination** task card. Therefore the most important and most frequently used programs should be at the top of the list.

- ◆ Drag the examination sets individually to the required position within the active pool.



*A horizontal line represents the examination set that is currently being moved.*

### Deactivating exam sets

You can deactivate individual examination sets by moving them from the active to the selection pool.

- ◆ Click on an examination set in the **Active Examination Sets** area.
- ◆ Click this button.



or

- ◆ Drag the examination set into the **Examination Set Pool** list using the mouse.



*At least one examination set must remain in the list of active examination sets.  
You cannot deactivate all examination sets.*

## *User-defined examination sets*

In the **Examination Set Configuration** dialog window, you can create your own examination sets with self-defined settings. In the **Examination** task card you can access these user-defined examination sets in the same way as the default standard examination sets.

User-defined examination sets are created on the basis of an existing examination set. You can adapt the system-specific parameters to your requirements by editing the individual operating programs assigned to the examination set.  
(→ page 12)

### **Creating exam sets**

- ◆ Select your template from the active or selectable examination sets.
- ◆ Click this button.
  - or —
  - ◆ Select **Copy As** in the context menu of the name entry for the examination set.
    - The **Copy As** dialog box is opened.
  - ◆ Enter a unique name for the new examination set.
  - ◆ Click this button.
    - The new examination set is created within the current medical application field and the selected body region and is added to the **Examination Set Pool**. If an active examination set was selected as a template, the newly created examination set is also included in the list of active examination sets list.

Copy As...

OK

### Renaming an exam set

- ◆ Double-click the name entry of the examination set you want to rename.
- or —
- ◆ Select **Rename** in the context menu of the name entry.
  - A dialog window is displayed in which you can enter the text.
- ◆ Enter a suitable name for your examination set.
- ◆ Confirm with the **Enter** (Return) key of your keyboard.
- The new name is accepted and is displayed in the examination set lists.



*The standard examination sets delivered with the system cannot be renamed.*

### Deleting exam sets

- ◆ Select the examination set that you want to delete.
- ◆ Click this button.
- or —
- ◆ Select **Delete** in the context menu of the name entry for the examination set.
  - A dialog window is displayed which prompts you to confirm deletion.
- ◆ Click this button.
- The examination set is deleted from the examination set lists.



*The standard examination sets delivered with the system cannot be deleted.*

## Editing exam sets

Examination parameters are changed by editing the corresponding operating programs. Operating program settings can be defined on separate tab cards which you can call up from the **Examination Set Configuration** dialog window after selecting the examination set.



*Changes to the parameters of an examination set should only be performed by experienced medical staff.*

*If the examination or operating parameters have been modified, a test pattern should be generated. In this way the new parameters can be verified.*



Edit...

- ◆ Select the examination set whose operating parameters you want to change.
- ◆ Click this button.
  - or —
- ◆ Select **Edit** in the context menu of the name entry for the examination set.
- The **Operating Program Configuration** window appears. Here you can define all the parameter settings for the different operating programs of the selected examination set.  
(→ page 12)

## *Operating programs*

An examination set consists of a set of operating programs. Each of these programs defines the settings for X-ray generation and image acquisition for one single operating mode.

The operating programs are configured in the **Operating Program Configuration** dialog, which you have called up from the **Examination Set Configuration** dialog.

The Operating Program Configuration dialog contains a tab card (labeled correspondingly) for each supported operating mode. In the tab cards you can specify the parameters of the operating program in the respective operating mode. In addition, some parameters may be common to several operating modes of an examination set (e.g. edge enhancement). They are available on other tab cards that are independent of the operating mode.



*The parameters for the Fluoroscopy, Pulsed Fluoroscopy and Digital Radiography modes are configured for every examination set. For the Subtraction option the parameters for the Subtraction and Roadmap modes are configured additionally. The parameters are individually adapted to each examination set.*

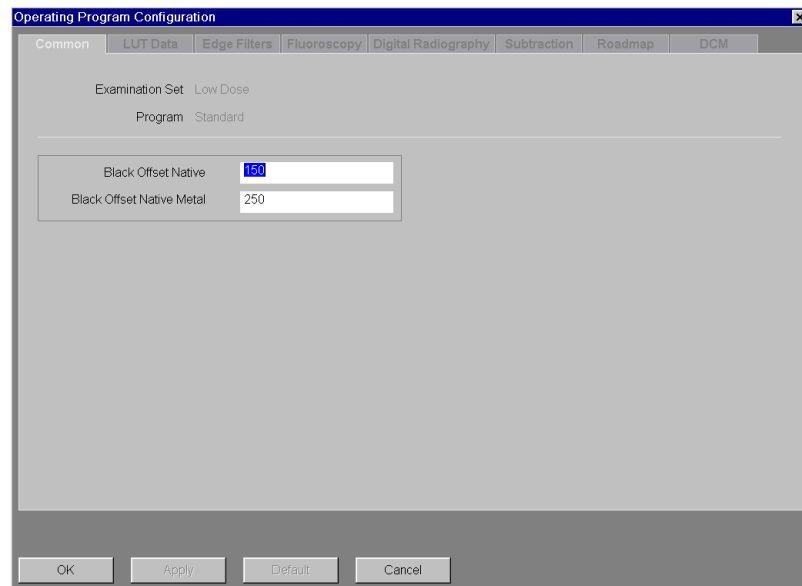


*There is a **Default** button on every tab card. With this button you can reset the parameters back to the original state (parameter settings of the underlying operating program).*



### The 'General' tab card

On this tab card you define the parameters that apply to all operating programs in each examination set.



#### Parameter settings

You can change the following parameters on the tab card:

Parameters	Additional info
Black Offset Native	possible values: 100 to 900
Black Offset Native Metal	possible values: 100 to 900

#### Changing parameters

- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —
- ◆ Click this button.
  - The dialog box is closed.



## *The Fluoroscopy tab card*

The operating programs for continuous fluoro and pulsed fluoro are configured on the same tab card. There are some parameters that are specific to each of these operating programs (**CONTINUOUS** and **PULSED** areas), and some that are identical for both (**COMMON** area).

The image shows a software configuration window titled "Operating Program Configuration" with a tabbed interface. The "Fluoroscopy" tab is selected. At the top, there are tabs for "Common", "LUT Data", "Edge Filters", "Fluoroscopy", "Digital Radiography", "Subtraction", "Roadmap", and "DCM". Below the tabs, the "Examination Set" is "Low Dose" and the "Program" is "CFC\_Standard, PFC\_Standard". The main area is divided into three sections: "CONTINUOUS", "PULSED", and "COMMON".

Section	Parameter	Value
CONTINUOUS	Noise Reduction	GGM (k = 8)
	Noise Reduction Low	GGM (k = 2)
	Autostore	off
	Storage Rate f/s	5.0
	Autoloop	<input type="checkbox"/>
PULSED	Pulsed - p/s	8
	Noise Reduction	GGM (k = 2)
COMMON	Noise Reduction Low	GGM off
	Autostore	off
	Storage Rate f/s	1.0
	Autoloop	<input type="checkbox"/>
	Dose Level	medium
COMMON	Characteristic Curve	HC2
	Bone Display	black

At the bottom of the window are four buttons: "OK", "Apply", "Default", and "Cancel".

## Parameter settings

You can change the following parameter on the tab card of the individual area:

Parameters	Additional info
Noise Reduction	Parameter sets for noise reduction and parameter sets for motion detection are possible
Noise Reduction Low	Noise Reduction Low is always less or equal to noise reduction
Autostore	off (no automatic storage) last (last image is stored) all (all images are stored)
Storage Rate f/s	only if Autostore = all Setting in frames/s
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure
Pulsed p/s	Possible values for storage rate depend on the set value
Dose Level	possible values: low, medium, high
Characteristic Curve	Entries can be defined using the service user interface
Bone Display	possible values: white, black

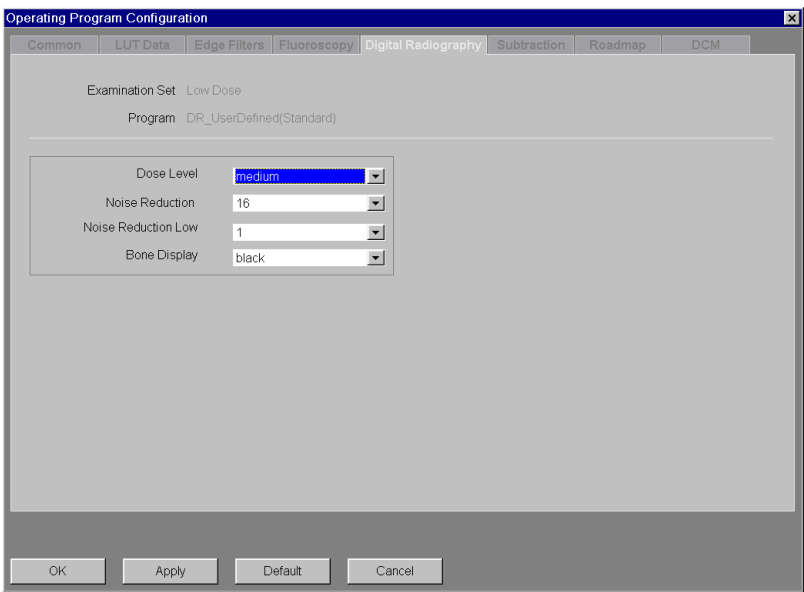
## Changing parameters

- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —
- ◆ Click this button.
  - The dialog box is closed.

Apply

OK

*The Digital Radiography tab card*



**Parameter settings**

You can change the following parameters on the tab card:

Parameters	Additional info
Dose Level	possible values: medium, high
Noise Reduction	Parameter sets for noise reduction and parameter sets for motion detection are possible
Noise Reduction Low	Noise Reduction Low is always less or equal to noise reduction
Bone Display	possible values: white, black

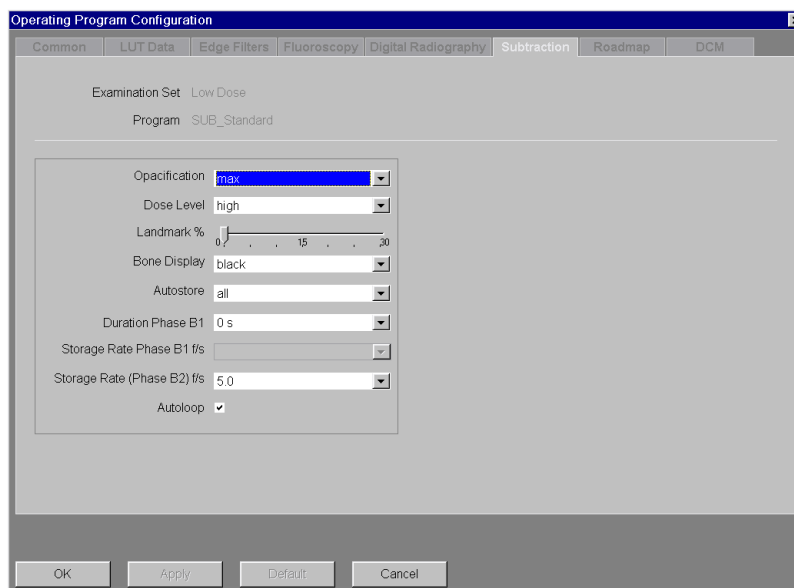
**Changing parameters**

- ◆ Select the required new parameters from the selection lists.
  - ◆ Click this button.
    - Your changes are applied to the ARCADIS Avantic system.
    - The configuration dialog remains open for further entries.
  - ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —
- ◆ Click this button.
    - The dialog box is closed.



## The Subtraction tab card

This tab card is available only with the **Subtraction** option.



### Parameter settings

You can change the following parameters on the tab card:

Parameters	Additional info
Opacification	possible values: min, max
Dose Level	possible values: medium, high
Landmark	with the slider: 0 to 30%, in steps of 5%
Bone Display	possible values: white, black
Autostore	off (no automatic storage) Phase B1, phase B2 (saves only images of the respective phase) all (all images are stored)
Duration Phase B1	Disabled if Autostore = 'off' otherwise enabled
Storage Rate Phase B1 f/s	Enabled if Autostore = 'all' and a duration phase B1 > 0 is set
Storage Rate (Phase B2) f/s	Enabled if Autostore = 'all'
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure

## Changing parameters



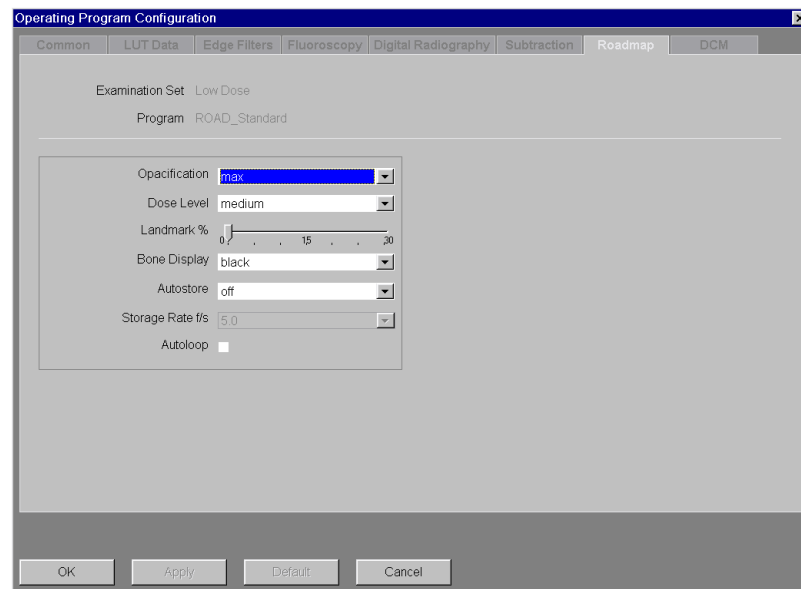
- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —



- ◆ Click this button.
  - The dialog box is closed.

## The Roadmap tab card

This tab card is available only with the **Subtraction** option.



### Parameter settings

You can change the following parameters on the tab card:

Parameters	Additional info
Opacification	possible values: min, max
Dose Level	possible values: medium, high
Landmark	with the slider: 0 to 30%, in steps of 5%
Bone Display	possible values: white, black
Autostore	off (no automatic storage) all (all images are stored)
Storage Rate f/s	only if Autostore = all Setting in frames/s
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure

## Changing parameters



- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Continue configuring the next operating mode on the corresponding tab card.
- or —

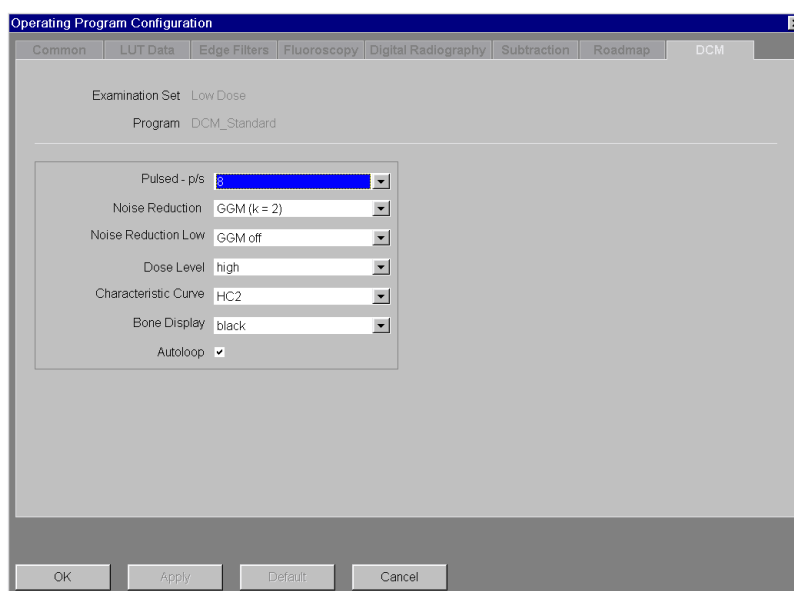


- ◆ Click this button.
  - The dialog box is closed.



## The DCM tab card

This tab card is only available with the **DCM** option.



### Parameter settings

You can change the following parameters on the tab card:

Parameters	Additional info
Pulsed p/s	For pulse rates < 3, no motion detection parameter sets can be selected in the noise reduction field.
Noise Reduction	Parameter sets for noise reduction and parameter sets for motion detection are possible
Noise Reduction Low	Noise Reduction Low is always less or equal to noise reduction
Dose Level	possible values: low, medium, high
Characteristic Curve	Entries can be defined using the service user interface
Bone Display	possible values: white, black
Autoloop	Check box for activating automatic playback of a sequence of images at the end of the exposure

## Changing parameters



- ◆ Select the required new parameters from the selection lists.
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Configure further parameters on the corresponding tab card.
- or —

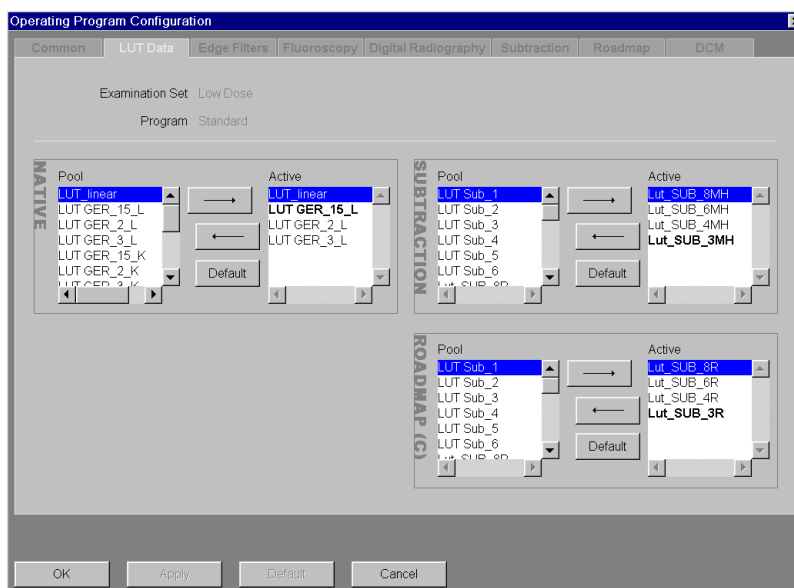


- ◆ Click this button.
  - The dialog box is closed.

### The LUT Data tab card

The specified Look-up-Tables (LUTs) are valid for those operating modes of the current examination set which generate/display native images.

If the SUB/Roadmap option is enabled, additional LUTs (look-up tables) can be selected for those operating modes of the current examination set that generate/display subtracted images.



Up to 4 LUT values can be activated. You can switch between them using the LUT keys for monitor A and monitor B on the C-arm system.

#### Activating LUTs (Look-up-Tables)

- ◆ In the left column (LUT pool) select the LUT that you want to activate.
- ◆ Click this button.
- The LUT is moved into the column of active LUTs and is thus available using the respective keys.



#### Deactivating LUTs

- ◆ Select the LUT that you want to activate in the right column (LUT pool).
- ◆ Click this button.
- The LUT is moved to the LUT pool. Thus it is inactive.



## Defining the LUT default settings

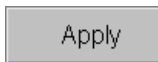
The first LUT value on the **Active** list is set as default. Use the **Default** buttons to define a different LUT value as default value.

- ◆ Select the value you want as default in the right column (active LUTs).
- ◆ Click this button.
  - The default LUT value is displayed in bold on the list.



## Saving parameters

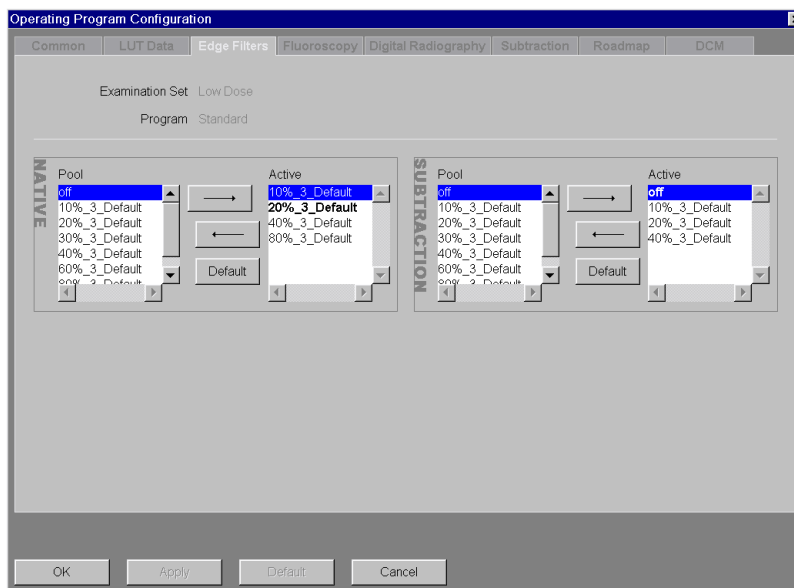
- ◆ Click this button.
  - Your changes are applied to the ARCADIS Avantic system.
  - The configuration dialog remains open for further entries.
- ◆ Configure further parameters on the corresponding tab card.
  - or –
- ◆ Click this button.
  - The dialog box is closed.



### *The Edge Filters tab card*

The edge enhancement values displayed are valid for those operating modes of the current examination set which generate/display native images.

If the SUB/Roadmap option is enabled, additional edge enhancement values can be selected for those operating modes of the current examination set that generate/display subtracted images.



#### **Parameter settings**

The entries on the lists of available or active edge enhancement values are defined as follows:

Entry	Comment
off	without edge enhancement
mm%_n_Default	mm: Edge enhancement in percent n: Kernel type



*Up to 4 edge enhancement values can be activated (including "off"). You can switch between them using the edge enhancement key on the C-arm system.*

## Activating edge enhancement values

- ◆ Select the value that you want to activate in the left column (edge enhancement pool).



- ◆ Click this button.

- The edge enhancement value is moved into the column of active values and is thus available via the respective key.

## Deactivating edge enhancement values

- ◆ Select the value that you want to activate in the right column (active edge enhancement value).



- ◆ Click this button.

- The edge enhancement value is moved to the edge enhancement pool. Thus it is inactive.

## Saving parameters

- ◆ Click this button.

- Your changes are applied to the ARCADIS Avantic system.
- The dialog box is closed.



# SIEMENS

## Operator Manual ARCADIS Avantic Technical Description

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.



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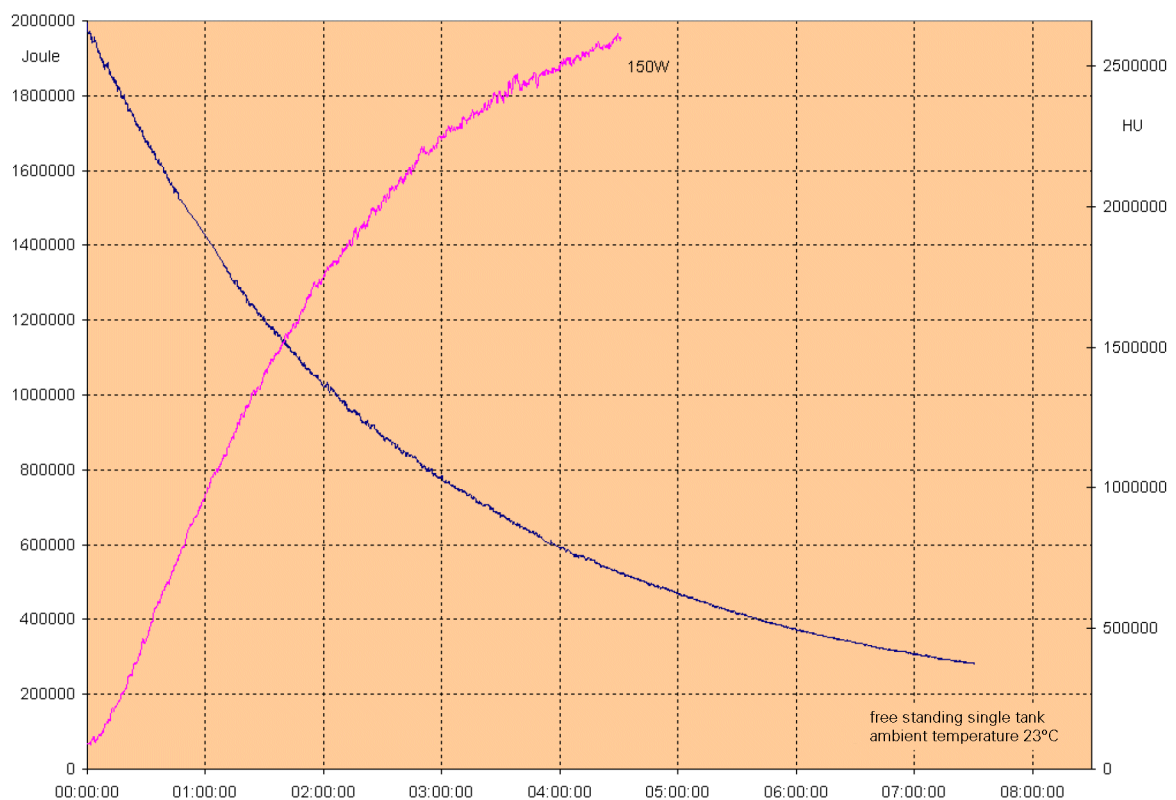
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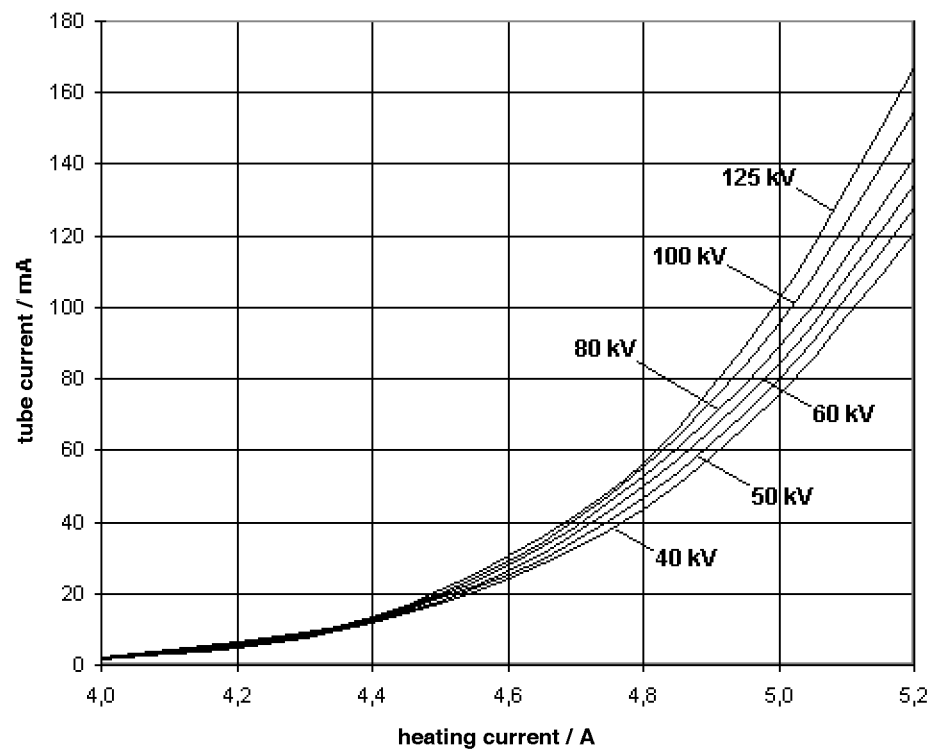
## Curves and diagrams

### POWERPHOS

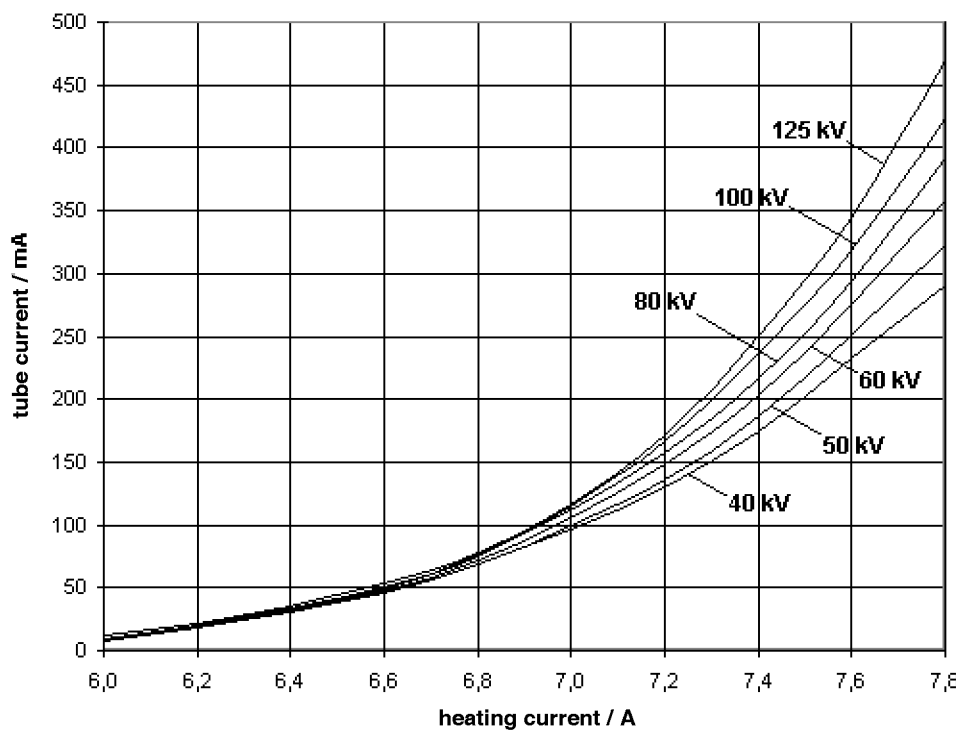
#### Heating and cooling curve of the single tank



*Emission curves focus 10kW*



*Emission curves focus 20kW*

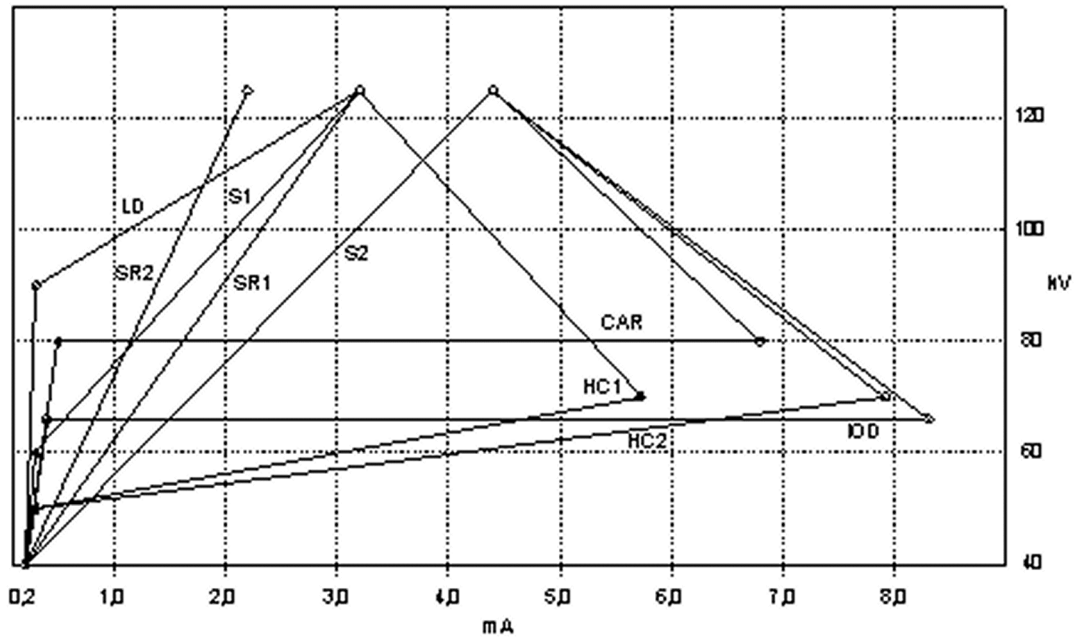


### *SIREMATIC curves*

The curves are used as follows:

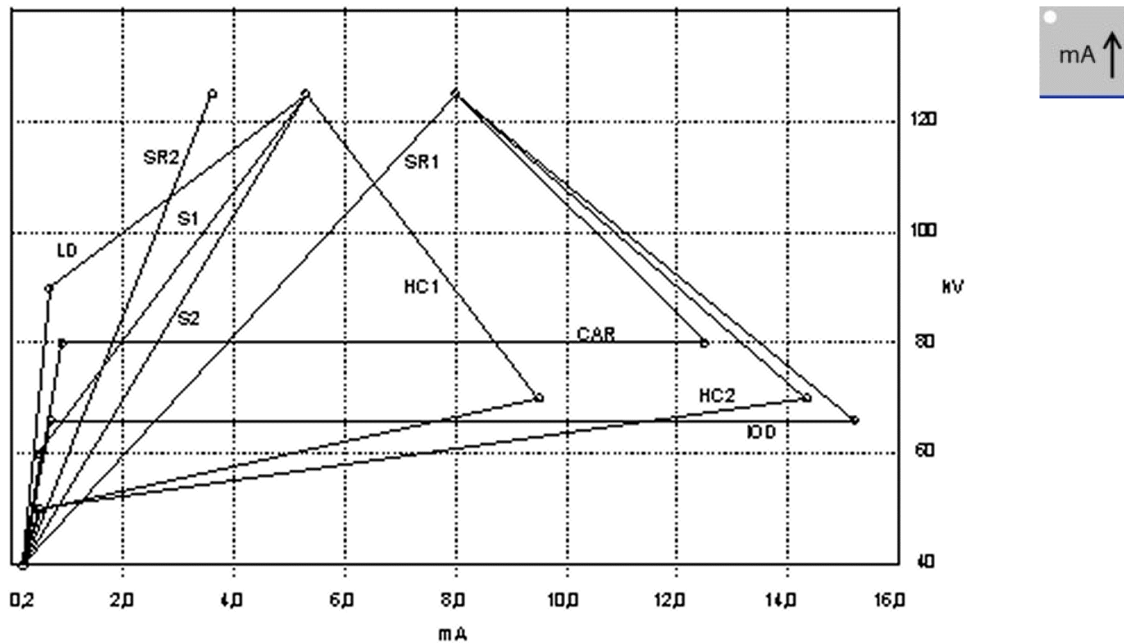
Characteristic Curve	Description
LD	Curve with very low skin dose (very high kV), low contrast. Only for special cases that require a very low dose, e.g. pediatrics.
S1	Almost continuously rising curve, rise from 60 kV. For extremities, low contrast with thicker objects.
S2	Almost continuously rising curve, rise from 40 kV. For extremities and thin objects, with thicker objects higher in contrast than S1.
HC1	High-contrast curve with maximum current at 70 kV, universally suitable.
HC2, HC3	High-contrast curves with maximum current at 70 kV, increased performance, universally suitable, also for thick objects.
IOD	Iodide curve, adapted to iodide contrast for cardiovascular application. Stable at 66 kV up to maximum performance. Maximum current at 66 kV, hence also suitable as high-contrast curve for thicker objects, but very high skin dose.
CAR	Cardiac curve, stable at 80 kV up to maximum performance; this reduces the bone contrast. From maximum current identical with iodide curve. Of advantage for cardiac pacemakers patients who are not too obese.
SR1	Curve for reduced performance, lower contrast.
SR2	Curve for reduced performance, lower contrast, increased noise.

*Characteristic curves for Fluoroscopy, Pulsed Fluoroscopy (< 4 p/s), Subtraction and Roadmap*



Characteristic Curve	Description
LD (Low Dose)	Low Dose curve (max. 3.2 mA) with high kV values.
S-1 (Standard)	Antiisowatt curve with max. 3.2 mA.
S-2 (Standard)	Antiisowatt curve with max. 4.4 mA.
HC-1	High-contrast curve with max. 4.9 mA.
HC-2	High-contrast curve for applications requiring higher mA values (max. 6.8 mA) e.g. spinal column, hip, skull.
IOD	Iodine curve with 8.3 mA (Subtraction, Roadmap). For special applications using iodine contrast agent.
CAR	Cardiac curve with 6.8 mA. Especially for cardiac applications.
SR-1 (reduced performance level)	Antiisowatt curve with max. 3.2 mA
SR-2 (reduced performance level)	Antiisowatt curve with max. 2.2 mA

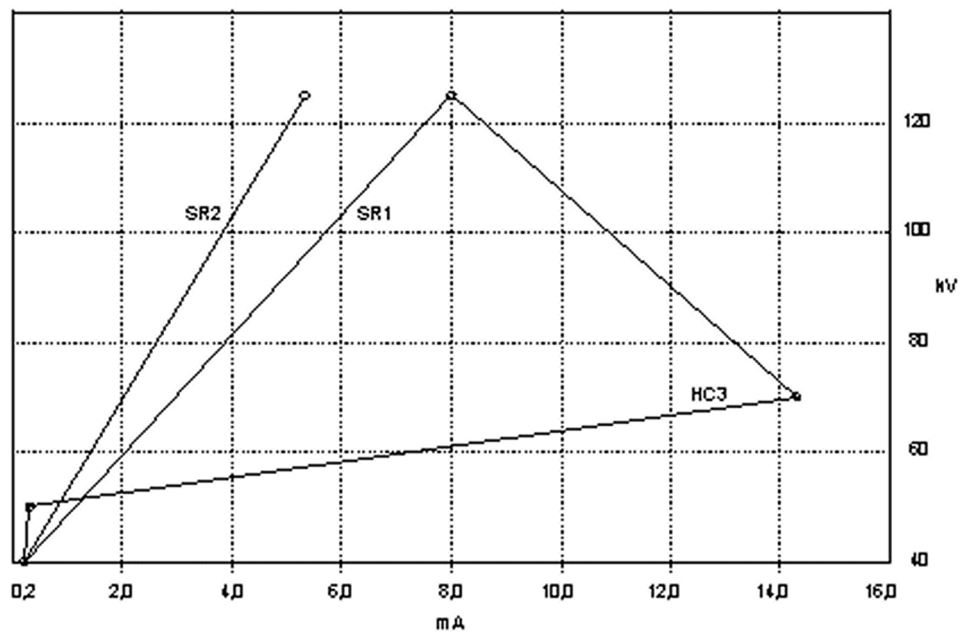
## High-contrast characteristic curves for Fluoroscopy



Characteristic Curve	Description
LD (Low Dose)	Low Dose curve (max. 5.3 mA) with high kV values.
S-1 (Standard)	Antiisowatt curve with max. 5.3 mA
S-2 (Standard)	Antiisowatt curve with max. 8.0 mA
HC-1	High-contrast curve with max. 9.5 mA.
HC-2	High-contrast curve for applications requiring higher mA values (max. 14.3 mA) e.g. spinal column, hip, skull.
IOD	Iodine curve with 15.2 mA (Subtraction, Roadmap). For special applications using iodine contrast agent.
CAR	Cardiac curve with 12.5 mA. Especially for cardiac applications.
SR-1 (reduced performance level)	Antiisowatt curve with max. 5.3 mA
SR-2 (reduced performance level)	Antiisowatt curve with max. 3.6 mA



### Characteristic curves for Digital Radiography ( $k > 1$ )



Characteristic Curves	Description
HC-3	High-contrast curve with max. applications requiring higher mA values (max. 14.3 mA) e.g. spinal column, hip, skull.
SR-1 (reduced performance level)	Antiisowatt curve with max. 8 mA
SR-2 (reduced performance level)	Antiisowatt curve with max. 5.3 mA

*Characteristic curves for Pulsed Fluoroscopy (4–15 p/s)*

	4 p/s			7.5 p/s			10 p/s			15 p/s		
Char-acter-istic Curve	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms
LD	3	40	8	3	40	8	3	40	8	3	40	8
	6	90	8	6	90	8	6	90	8	6	90	8
	35,2	125	23	35,2	125	12	35,2	125	9	35,2	125	8
S1	3	40	8	3	40	8	3	40	8	3	40	8
	6	60	8	6	60	8	6	60	8	6	60	8
	35,2	125	23	35,2	125	12	35,2	125	9	35,2	125	8
S2	3	40	8	3	40	8	3	40	8	3	40	8
	35,2	125	31	35,2	125	17	35,2	125	13	35,2	125	8
HC1	3	40	8	3	40	8	3	40	8	3	40	8
	6	50	8	6	50	8	6	50	8	6	50	8
	62,9	70	23	62,9	70	12	62,9	70	9	62,9	70	8
	35,2	125	23	35,2	125	12	35,2	125	9	26,7	125	8
HC2	3	40	8	3	40	8	3	40	8	3	40	8
	6	50	8	6	50	8	6	50	8	6	50	8
	62,9	70	31	62,9	70	17	62,9	70	13	62,9	70	8
	35,2	125	31	35,2	125	17	35,2	125	13	35,2	125	8
IOD	3	40	8	3	40	8	3	40	8	3	40	8
	6	66	8	6	66	8	6	66	8	6	66	8
	66,7	66	31	66,7	66	17	66,7	66	13	66,7	66	8
	35,2	125	31	35,2	125	17	35,2	125	13	35,2	125	8
CAR	3	40	8	3	40	8	3	40	8	3	40	8
	6	80	8	6	80	8	6	80	8	6	80	8
	55	80	31	55	80	17	55	80	13	55	80	8
	35,2	125	31	35,2	125	17	35,2	125	13	35,2	125	8
SR1	3	40	8	3	40	8	3	40	8	3	40	8
	35,2	125	23	35,2	125	12	35,2	125	9	26,7	125	8
SR2	3	40	8	3	40	8	3	40	8	3	40	8
	35,2	125	16	35,2	125	8	28,0	125	8	18,7	125	8

*Characteristic curves for Digital Cine Mode (0.5–4 p/s)*

	0.5 p/s			1 p/s			2 p/s			4 p/s		
Char-acter-istic Curve	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms
LD	10	40	7	10	40	7	10	40	7	10	40	7
	20	90	7	20	90	7	20	90	7	20	90	7
	160	125	67	160	125	34	160	125	17	160	125	8
S1	10	40	7	10	40	7	10	40	7	10	40	7
	20	60	7	20	60	7	20	60	7	20	60	7
	160	125	67	160	125	34	160	125	17	160	125	8
S2	10	40	7	10	40	7	10	40	7	10	40	7
	160	125	100	160	125	50	160	125	25	160	125	13
HC1	10	40	7	10	40	7	10	40	7	10	40	7
	20	50	7	20	50	7	20	50	7	20	50	7
	250	70	40	250	70	38	250	70	19	250	70	10
	160	125	67	160	125	34	160	125	17	160	125	8
HC2	10	40	7	10	40	7	10	40	7	10	40	7
	20	50	7	20	50	7	20	50	7	20	50	7
	250	70	40	250	70	40	250	70	29	250	70	14
	160	125	100	160	125	50	160	125	25	160	125	13
IOD	10	40	7	10	40	7	10	40	7	10	40	7
	20	66	7	20	66	7	20	66	7	20	66	7
	250	66	40	250	66	40	250	66	30	250	66	15
	160	125	100	160	125	50	160	125	25	160	125	13
CAR	10	40	7	10	40	7	10	40	7	10	40	7
	20	80	7	20	80	7	20	80	7	20	80	7
	250	80	40	250	80	40	250	80	25	250	80	13
	160	125	100	160	125	50	160	125	25	160	125	13
SR1	10	40	7	10	40	7	10	40	7	10	40	7
	160	125	100	160	125	50	160	125	25	160	125	13
SR2	10	40	7	10	40	7	10	40	7	10	40	7
	160	125	67	160	125	34	160	125	17	160	125	8

*Characteristic curves for Digital Cine Mode (7.5–30 p/s)*

	7.5 p/s			10 p/s			15 p/s			30 p/s		
Char-acter-istic Curve	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms	mA	kV	Pulse width / ms
LD	10	40	7	10	40	7	10	40	7	10	40	7
	20	90	7	20	90	7	20	90	7	20	90	7
	102,1	125	7	76,6	125	7	51,1	125	7	25,5	125	7
S1	10	40	7	10	40	7	10	40	7	10	40	7
	20	60	7	20	60	7	20	60	7	20	60	7
	102,1	125	7	76,6	125	7	51,1	125	7	25,5	125	7
S2	10	40	7	10	40	7	10	40	7	10	40	7
	160	125	7	125,7	125	7	83,8	125	7	41,9	125	7
HC1	10	40	7	10	40	7	10	40	7	10	40	7
	20	50	7	20	50	7	20	50	7	20	50	7
	182,3	70	7	136,7	70	7	91,2	70	7	45,6	70	7
	102,1	125	7	76,6	125	7	76,6	125	7	25,5	125	7
HC2	10	40	7	10	40	7	10	40	7	10	40	7
	20	50	7	20	50	7	20	50	7	20	50	7
	250	70	8	224,5	70	7	149,6	70	7	74,8	70	7
	160	125	7	125,7	125	7	83,8	125	7	41,9	125	7
IOD	10	40	7	10	40	7	10	40	7	10	40	7
	20	66	7	20	66	7	20	66	7	20	66	7
	250	66	9	238,1	66	7	158,7	66	7	79,4	66	7
	160	125	7	125,7	125	7	83,8	125	7	41,9	125	7
CAR	10	40	7	10	40	7	10	40	7	10	40	7
	20	80	7	20	80	7	20	80	7	20	80	7
	250	80	7	196,4	80	7	130,5	80	7	65,5	80	7
	160	125	7	41,9	125	7	83,8	125	7	41,9	125	7
SR1	10	40	7	10	40	7	10	40	7	10	40	7
	160	125	7	125,7	125	7	83,8	125	7	41,9	125	7
SR2	10	40	7	10	40	7	10	40	7	10	40	7
	102,1	125	7	76,6	125	7	51,1	125	7	25,5	125	7

### *Characteristic curves for Digital Radiography ( $k = 1$ )*

<b>Characteristic Curve</b>	<b>mA</b>	<b>kV</b>	<b>Pulse width / ms</b>
HC3	10	40	20
	20	50	20
	250	70	40
	200	125	40
SR1	10	40	20
	200	125	20
SR2	10	40	20
	200	125	26,8

### *Dose rate at the image intensifier input*

The dose rate is set by the manufacturer, depending on the image intensifier format; it is measured behind the scattered radiation grid at the input of the image intensifier. For system-specific dose values please see acceptance test record §16 RöV (only Germany).

Using a test phantom, the dose rate was set in a kV range between 70 kV and 80 kV with the iris diaphragm open to maximum aperture.

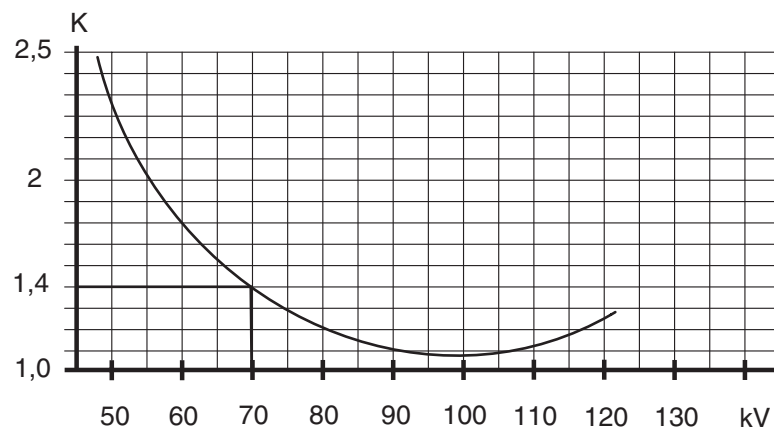
### *Deviations from the dose rate set at the image intensifier input*

The fluoroscopic data (kV, mA) vary depending on the object examined. The sensitivity of the image intensifier is influenced by beam quality (kV). As a consequence, different dose rates may result at the II input screen for the same luminance at the II output screen.

When examining a patient in fluoroscopy mode, additional scatter radiation values are produced in comparison to the phantom values, affecting the dose rate at the image intensifier input.

### Deviation calculation

Using K as a correction value, (refer to diagram), the approximate deviation value from the set dose rate can be calculated.



Calculation example: With 70 kV the correction value is 1.4. That is, if the set dose rate value is 0.22  $\mu\text{Gy/s}$ , the actual value is approx.  $0.22 \mu\text{Gy/s} \times 1.4 = 0.308 \mu\text{Gy/s}$ .

### Setting the dose rate value

desired, the preferential position for the dose rate can be reprogrammed.

## Technical data

### Complete system

#### General data

Power requirements:	100 V, 110 V, 120 V, 127 V, 200 V, 230 V, 240 V $\pm$ 10 %; 50/60 Hz $\pm$ 1 Hz
Nominal rating	20 A to 127 V~, 15 A from 200 V~ corresponds to the rated value of the slow-blow fuse in the mains input of the product
Internal line resistance	Ri < 0.3 ohms at 100 - 127 V~ Ri < 0.8 ohms at 200 - 240 V~
Power consumption	max. 2.5 kVA
Weight	C-arm system approx. 350 kg Monitor trolley with 2 monitors, approx. 190 kg (with PC and UPS)
Environmental conditions for operation	Temperature range: +15 °C to +35 °C Rel. humidity: 15 % to 75 %, non-condensing Barometric pressure: 700 hPa to 1060 hPa
Environmental conditions for transport	Temperature range: -20 °C to +37.5 °C Rel. humidity: 10 % to 95 %, non-condensing Barometric pressure: 700 hPa to 1060 hPa

#### Classification

Protection against electric shock	Class 1, no applied part acc. to IEC 60601-1
Protection against ingress of fluids	IPXO (not protected) according IEC 60529
Operating mode	Continuous operation

### Current / voltage values

Voltage	Long-term current consumption	Short-term current consumption
100 V	15 A	28 A
110 V	14 A	26 A
120 V	13 A	24 A
127 V	12 A	22 A
200 V	8 A	14 A
230 V	7 A	12 A
240 V	7 A	12 A

## Generation of radiation

### Generator

Type:	RF generator with POWERPHOS single tank
Rated power (IEC 601):	15 kW
Max. pulsed output:	25 kW
Inverter control frequency:	15 kHz to 35 kHz
kV range:	40 kV to 125 kV
Continuous Fluoroscopy:	0.2 mA to 15.2 mA (max. 1000 W)
Digital Radiography:	0.2 mA to 250 mA
Pulsed Fluoroscopy:	0.2 mA to 67 mA
Pulse rate:	0.5 f/s to 8 f/s, or up to 15 f/s as an option
DCM (Digital Cine Mode):	0.2 mA to 250 mA
Pulse width:	min. 7 ms
Pulse rate:	0.5 f/s to 8 f/s, or up to 30 f/s as an option
Tolerances:	kV $\pm 10\%$ (measured with spectrometric kV method) mA $\pm 10\% \pm 0.1$ mA Fluoroscopic time < 100 min: 1 digit = 6 s ( $\pm 5\%$ ) Fluoroscopic time $\geq 100$ min: 1 digit = 1 min ( $\pm 5\%$ )



### Tube assembly

Type:	Double-focus rotating anode tube, focal spot nominal value 0.3/0.5
Inherent filtration (IEC 601):	2.5 mm Al / 0.1 mm Cu
Rated voltage (IEC 613)	125 kV
Anode heat storage capacity (IEC613):	200.000 J
Heat storage capacity POWERPHOS (IEC613)	1,900,000 J

## System components

### C-arm

C-arm orbital movement:	132° (-42° to +90°)
C-arm angulation:	±190°
C-arm horizontal movement:	20 cm
C-arm immersion depth:	73 cm
C-arm swivel range:	±10°
C-arm vertical movement:	38 cm, motorized
Source-I.I. distance:	100 cm
Free space:	78 cm

### Image intensifier

SIRECON 33-3HDR-4	Nominal diameter 33 cm
Format switch-over:	21 cm / 16 cm / 12 cm

## Technical Description

---

### **Scattered radiation grid at I.I. input**

Round grid:	Pb 17/70, fo100
Attenuation factor	m = 1.5

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### **Collimator system**

Collimator system:	Iris diaphragm for concentric collimation and semi-transparent slot diaphragm for collimation with unlimited rotation.
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### **Imaging chain**

Camera with CCD sensor	1024 (H) x 1024 (V)
Aspia imaging system	Features, e.g. digital image rotation 360°

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### **Monitors**

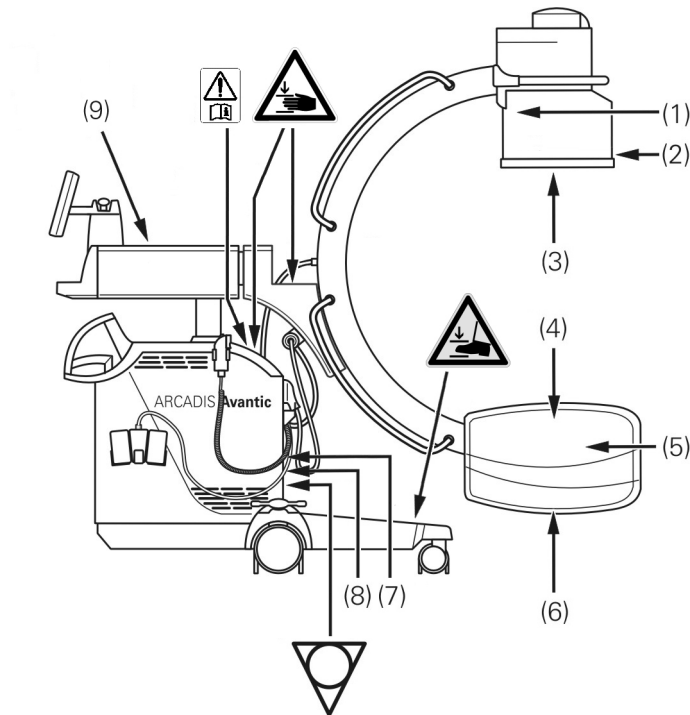
TFT color displays	Resolution 1280 x 1024 (pixels)
Screen diagonal	46 cm (18")
Brightness	250 cd/m <sup>2</sup>

---

## Labels

### C-arm system overview

The labels shown below are permanently affixed to the following components.



- (1) I.I. housing
- (2) I.I. laser aimer (option)
- (3) Image intensifier grid
- (4) Single-tank laser targeting device (option)
- (5) Tube shutter
- (6) POWERPHOS X-ray tube assembly (with optional spacer)
- (7) X-ray system (control); system identification label
- (8) X-ray generator
- (9) Support arm

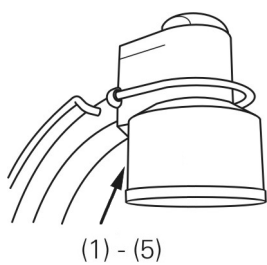


Warnings: Crush hazard for hand/foot, read operator manual

Symbol: Equipotential bonding

C-arm system

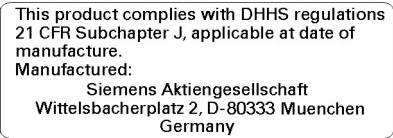
I.I. housing



(1)  
Label for I.I. in general



(2)  
Label for I.I.



(3)  
Approval label



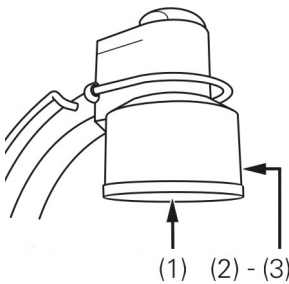
(4)  
Approval label



(5)

Approval label

## I.I. laser aimer (option)



(1)

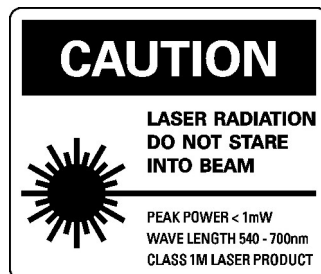
Label for I.I. laser



(2)

for USA and Canada

Warning label



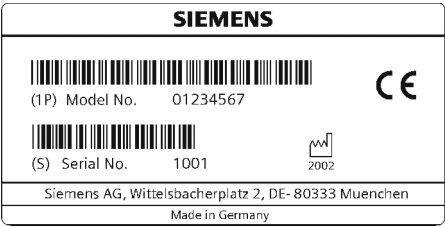
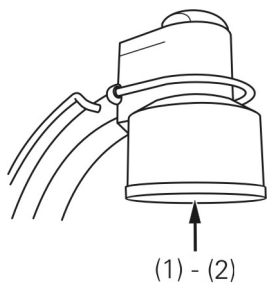
(3)

for USA/Canada/Great Britain

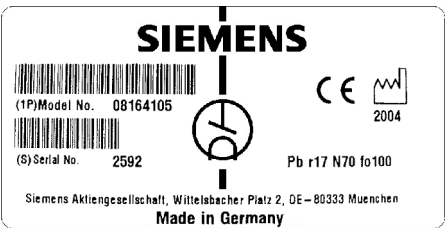
Warning label



Image intensifier grid

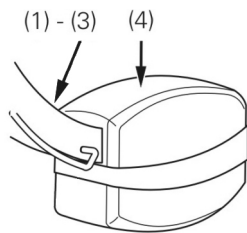


(1)  
Label for I.I. grid in general



(1)  
GRID label

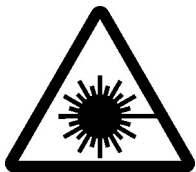
Single-tank laser targeting device (option)



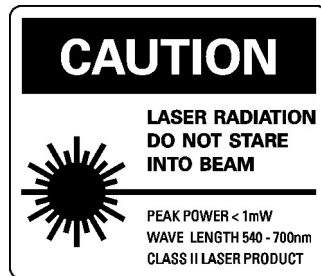
(5) - (7) Chassis



(1)  
Countries other than USA/Canada  
Warning label



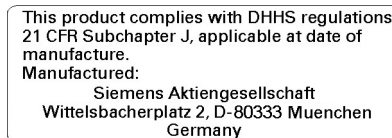
(2)  
Countries other than USA/Canada  
Warning label



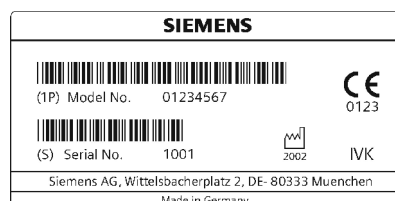
(3)  
for USA and Canada  
Warning label



(4)  
for USA/Canada/Great Britain  
Warning label



(5)  
Approval label

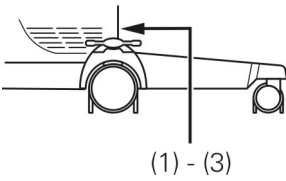


(6)  
Manufacturer's identification label



(7)  
Additional label

Tube shutter



(1)  
Manufacturer's identification label



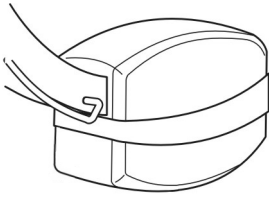
(2)  
Approval label



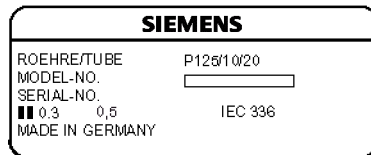
(3)  
Additional label



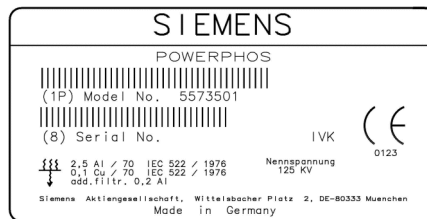
## POWERPHOS tube assembly



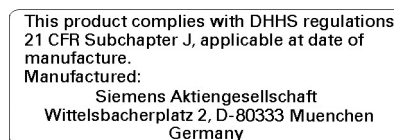
(1) - (4) Chassis



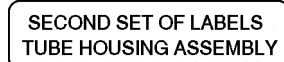
(1)  
Tube label



(2)  
Special label with beam entry

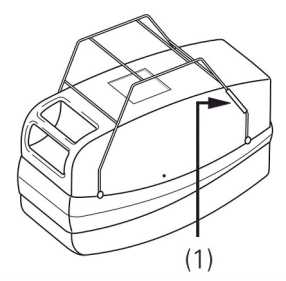


(3)  
Approval label



(4)  
Additional label

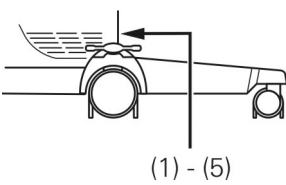
Spacer



10048649 Arcadis Avantic

(1)  
Identification

X-ray system (control)



(1)  
System identification:  
Manufacturer's identification label



(2)  
Approval label



(3)  
Approval label

(4)

Approval label

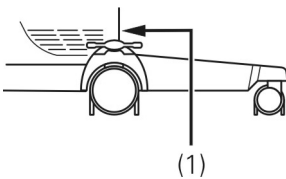
This product complies with DHHS regulations  
21 CFR Subchapter J, applicable at date of  
manufacture.  
Manufactured:  
Siemens Aktiengesellschaft  
Wittelsbacherplatz 2, D-80333 Muenchen  
Germany

(5)

Revision level label



Mat. Nr.  
REV 01 02 03 04 05 06 07  
08 09 10 11 12 13 14 15

## *X-ray generator*

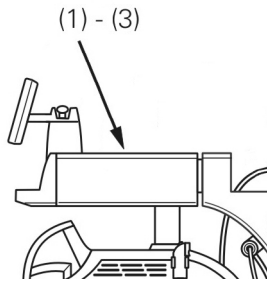


(1)

Label

SIEMENS		
		
(1P) Model No.	01234567	
		
(S) Serial No.	1001	IVK
Siemens AG, Wittelsbacherplatz 2, DE- 80333 Muenchen		
Made in Germany		

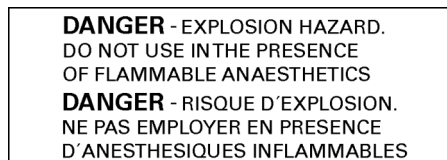
## Support arm



- (1)  
for Canada only  
Warning label

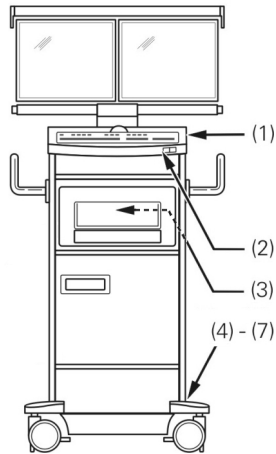


- (2)  
for Germany/Austria only  
Warning label



- (3)  
for USA and Canada  
Warning label

## Monitor trolley with TFT monitors



**DANGER** - EXPLOSION HAZARD.  
DO NOT USE IN THE PRESENCE  
OF FLAMMABLE ANAESTHETICS  
**DANGER** - RISQUE D'EXPLOSION.  
NE PAS EMPLOYER EN PRESENCE  
D'ANESTHESIQUES INFLAMMABLES

(1)  
for USA and Canada  
Warning label

**WARNING:**  
THIS X-RAY UNIT MAY BE DANGEROUS TO  
PATIENT AND OPERATOR UNLESS SAFE EXPO-  
SURE FACTORS AND OPERATING INSTRUCTIONS  
ARE OBSERVED.

(2)  
for USA and Canada  
Warning label

— or —

**WARNING!**  
THIS X-RAY UNIT MAY BE DANGEROUS TO  
PATIENT AND OPERATOR UNLESS SAFE EXPO-  
SURE FACTORS, AND OPERATING INSTRUCTIONS  
AND MAINTENANCE SCHEDULES ARE OBSERVED.

(3)  
Optional label country-specific  
connection data

Volt	50Hz	60Hz	Long Time	Moment
			Current	Current
100~	<input type="checkbox"/>	<input type="checkbox"/>	15 A	28 A
110~	<input type="checkbox"/>	<input type="checkbox"/>	14 A	26 A
120~	<input type="checkbox"/>	<input type="checkbox"/>	13 A	24 A
127~	<input type="checkbox"/>	<input type="checkbox"/>	12 A	22 A
200~	<input type="checkbox"/>	<input type="checkbox"/>	8 A	14 A
230~	<input type="checkbox"/>	<input type="checkbox"/>	7 A	12 A
240~	<input type="checkbox"/>	<input type="checkbox"/>	7 A	12 A



(4)  
Manufacturer's identification label  
(Monitor trolley)



(5)  
Approval label



(6)  
Approval label

Rev.	01	02	03	04	05	06	07	08	09	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38

(7)  
Manufacturer's revision level label

# SIEMENS

## Operator Manual ARCADIS Avantic Maintenance

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.



### Functional and safety checks

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Prior to the examination . . . . .	3
Checks prior to special examinations (e.g. of the open heart and skull) . . . . .	3
Monthly checks . . . . .	4
Checking the dose rate control function . . . . .	4
Checking the EMERGENCY STOP function for motor-driven system movements . . . . .	4
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## *Functional and safety checks*

To ensure that the ARCADIS Avantic is ready for operation and all safety features are functioning properly, you must perform regular functional and safety checks.

### *Daily checks*

#### *Prior to the examination*

- ◆ Check the power plug. If the power plug is damaged, the ARCADIS Avantic must not be used.
- ◆ Check the power cable. If the power cable is damaged, the ARCADIS Avantic must not be used.
- ◆ Check the function of the foot brakes of the C-arm system and the monitor trolley as well as the steering of the C-arm system.
- ◆ Check the C-arm counterbalance after releasing the brakes.
- ◆ Check the function of all radiation indicators.
- ◆ Inspect the housing of the I.I. and the single tank for mechanical damage.
- ◆ Check that the I.I. grid and the knurled screw are fastened properly.

### *Checks prior to special examinations (e.g. of the open heart and skull)*

- ◆ Make sure that there is an additional conductive connection between the C-arm system and a point of potential equalization, e.g. the patient table.

### *Monthly checks*

#### *Checking the dose rate control function*

This following simple procedure allows you to check the automatic dose rate control function without an object in the beam path. A kV value of  $\leq 45$  kV must be displayed:

- ◆ Open the iris and slot diaphragms to maximum aperture.
- ◆ Press the **Dose rate control Stop** (ADR Stop) key.
- ◆ Select 125 kV with the +/- keys.
- ◆ Press the **ADR Stop** key again.
  - The stop function is canceled; automatic dose rate control is switched on again.
- ◆ Release radiation in the fluoroscopy mode.
  - The tube voltage is reduced to a value  $\leq 45$  kV.
  - The monitor image is not overexposed.

#### *Checking the EMERGENCY STOP function for motor-driven system movements*

- ◆ Switch the ARCADIS Avantic on.
- ◆ Move the lifting column and press the **EMERGENCY STOP** button at the same time.
  - The lifting movement is stopped.
  - A message is displayed on the monitor indicating that EMERGENCY STOP has been actuated.
- ◆ Unlock the **EMERGENCY STOP** button again.
- ◆ Press one of the keys for moving the lifting column.
  - The lifting movement is enabled again.

## *Maintenance plan for checking the system*

The tests and inspections required by national laws or regulations, such as DHHS regulations or RöV (constancy tests), are not part of the activities listed in this maintenance plan.

If national laws or regulations specify more frequent checking and/or maintenance, this must be observed.

Maintenance work should be performed by trained technical personnel only. To keep the system in an optimum condition, we recommend that you conclude a maintenance contract. If you have any questions relating to maintenance/maintenance contract please contact our Siemens Customer Service.



*Please observe the relevant information in the  
(→ Register 1: Safety, page 8)*

## *Checking the system*

The stated functions are minimum requirements.

<b>Procedures to be performed</b>	<b>Function</b>	<b>Interval</b>
Mechanical safety	Damage to the housing, system movements and options (e.g. spacer)	12 months
Electrical safety	Ground conductor, grounding strap on the C-arm system, cables and plugs	12 months
Functional check	Emergency stop and lifting column	12 months
Image quality	Image display and image processing	12 months

- ◆ Perform the checks at the specified intervals.

# *Service support via network connection*

Siemens Customer Service has the possibility of accessing the ARCADIS Avantic via an active network connection or a modem.



*With full access, the image area of the left monitor is superimposed by a full screen message. When this message is displayed, radiation can still be released.*



*The ARCADIS Avantic should only be operated within a virus-protected hospital network.*

## *Remote service access*

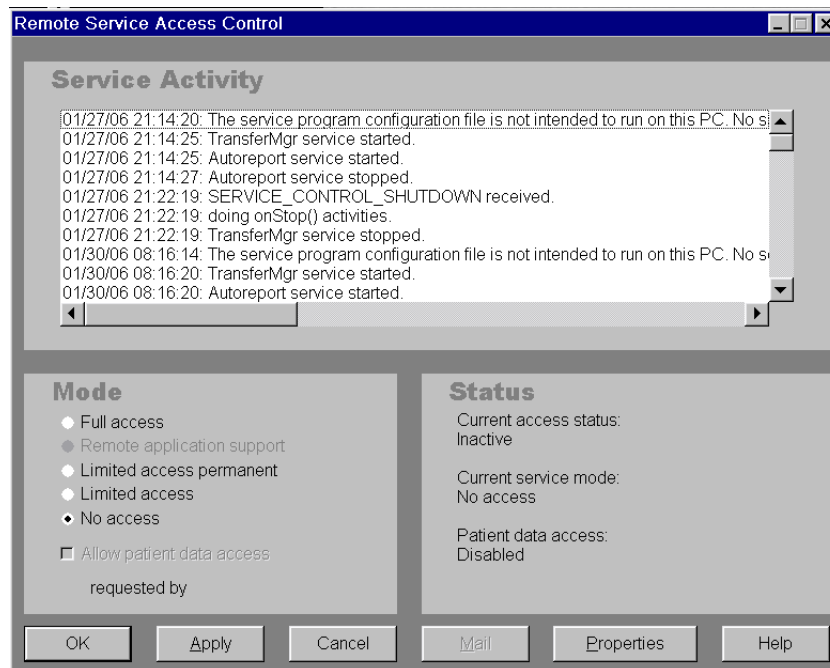
The **Remote Service Access Control** window allows you to grant Service personnel access rights so that they can perform maintenance.



*If the Remote Service Access Control option is activated, remote service can only be performed from "trusted systems" (systems that have exchanged "proved certificates" with your syngo system).*

### **Calling up Remote Service Access Control**

- ◆ Select **Options > Service > Remote Service**.
- The **Remote Service Access Control** window is displayed.



### Limiting access rights

As long as you have assigned Service personnel full access rights (Full Access), i.e. as long as maintenance is being carried out, you cannot work with your ARCADIS Avantic system.

## WARNING

Aborting remote service without consultation with service engineers.

**Aborting remote service cancels all service procedures and causes the ARCADIS Avantic to malfunction!**

◆ Always consult with a service engineer before aborting remote service

◆ Select **Limited access** or **No access** and confirm with **OK** or **Apply** to continue working.



*For further information, please contact Siemens Service or your system administrator.*

### *Service access*

In order to allow service activities, users with the relevant privilege must grant the service engineer access to the computer. The procedure differs for local service and remote service access.

#### **Remote service access**

Remote service access allows the service engineer to carry out maintenance activities from his workstation.

☐ **Full access**

Allows the service engineer to take control of your workstation (in which case your workstation will be disabled for you).

☐ **Limited access**

This mode provides access to all service functions that do not interfere with regular patient operations.

☐ **Access to patient data**

The service engineer has no access to patient data via remote service. If such access is needed, it must be requested from you.

☐ **Application remote support**

☐ **No access**

- ◆ Start a remote service session and wait for confirmation from the other workstation.
- ◆ Depending on the required service activities, you will assign the service engineer full or limited access to your workstation.

#### **Terminating a service session**

If you end a remote service session while the service engineer is still working, all currently active service programs will be terminated. This may cause the ARCADIS Avantic to be inconsistent or inoperable.



*The service engineer is only notified that the session is going to be ended by you.*

- ◆ Check with the service engineer before you end the session.



## *Cleaning and disinfection*

Before cleaning or disinfecting the ARCADIS Avantic, the system must be disconnected from the mains and switched off.

### *Cleaning*

All parts that come into contact with patients must be cleaned prior to each examination.

---

#### **CAUTION**

Cleaning agents or fluids penetrating into the equipment.

**This can cause danger or damage to the ARCADIS Avantic!**

- ◆ Never spray the ARCADIS Avantic!
- 
- ◆ Clean the parts with a damp cloth.
  - ◆ For cleaning, use water or a lukewarm diluted solution of water and a commercially available cleaning agent.
  - ◆ Do not use abrasive cleaning agents or organic solvents or solvent-based cleaning agents such as benzine, alcohol, spot removers, etc., due to potential material incompatibility.

### *Disinfection*

For the disinfection of surfaces we recommend liquid solutions of common surface disinfectants based on aldehyde and/or amphoteric surfactants, e.g. Tensodur 103, Korsolin, Cidex.

Substituted phenol-based or chlorine-releasing disinfectants can weaken materials and are therefore not recommended. The same restrictions apply to undiluted solutions with a high alcohol content, e.g. for disinfecting hands.

---

#### **CAUTION**

The spray mist of disinfectant sprays may penetrate into the equipment.

**Sprays can cause damage to electronic components or the formation of flammable mixtures of air/vapor!**

◆ Disinfectant sprays should generally not be used!

---

◆ Please follow the instructions for use of the disinfectant.



*As is commonly known, some substances in disinfectants are hazardous to health. Their concentration in the air must not exceed the legally defined limit. We recommend that you follow the manufacturer's instructions for the use of these products.*

## *Screen surfaces / TFT displays*

Monitors should be cleaned at least every two months.

---

### **CAUTION**

Acids or alkaline solutions on the monitor screen.

#### **This may damage the monitor screen!**

- ◆ Monitors with anti-glare, non-reflective surfaces should only be cleaned with a soft cloth.
- 
- ◆ Clean the monitor screen with a cotton cloth dampened with water.
  - ◆ Remove stubborn stains with a mixture of 2/3 water and 1/3 alcohol.
  - ◆ Immediately dry off the monitor screen with a soft cotton cloth.
  - ◆ Wipe off contrast agent spots as soon as possible.

For notes

# SIEMENS

## Operator Manual ARCADIS Avantic Accessories and Options

**SP**

Please observe the

**Safety register**

This must be studied thoroughly before system startup.

The original version of this Operator Manual was written in the English language.

## Accessories

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## Accessories



*Anyone who connects additional equipment to the medical device configures the system and is therefore responsible for ensuring that the system configuration in its current version complies with the relevant standards (e.g. system standard IEC/EN 60601-1-1 and/or other applicable standards). In the case of queries please contact your local contact person.*

The following accessories have been approved for use with the ARCADIS Avantic:

Accessories	Part Number	Manufacturer
Sterile cover set (C-arm, I.I., single tank)	10047656	Microtec
Sterile cover for I.I.	10047658	Microtec
Grounding cable	2171767	Nicolay Services GmbH
Spacer	10048649	Techno Blech GmbH
I.I. laser aimer	3099988	Z-Laser Optoelektronik GmbH
Single-tank laser targeting device	10047655	Siemens AG

### *Grounding cable (optional)*

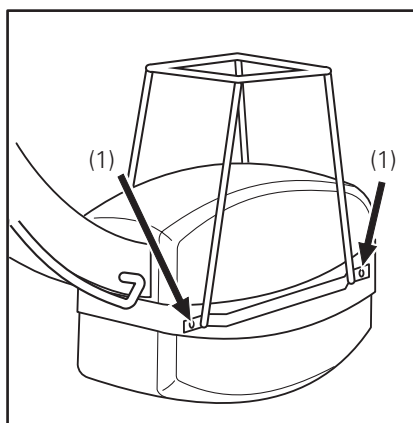
An optional grounding cable is available for equipotential bonding in accordance with DIN 57107/VDE 0107 for rooms of Application Group 2E (cardiac catheterization).

- ◆ Use the grounding cable for examinations of the open heart and skull (in addition to the equipotential bonding connection).

### *Spacer*

The distance between the source and tube assembly cover (shortest possible source-skin distance) is  $\geq 200$  mm with the standard system (acc. to IEC 601-1-3).

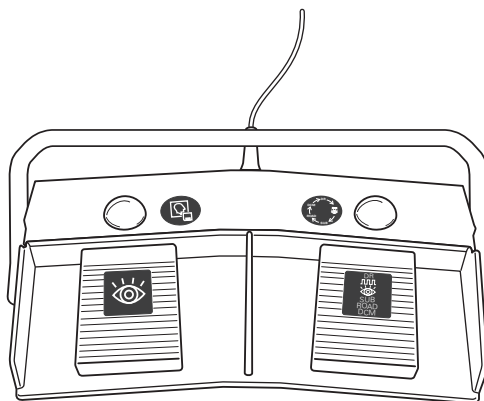
Country-specific regulations may require a larger source-skin distance ( $\geq 300$  mm acc. to DHHS 21CFR). This is achieved by attaching an additional spacer to the C-arm system.



(1) Knurled screws

- ◆ If this source-skin distance is too large for special surgical examinations, the spacer can be removed by loosening the knurled screws.
  - The spacing device must be reattached after this type of examination to ensure the reduction in skin dose resulting from a greater source-skin distance.

## *Multifunctional footswitch (option)*



---

### **WARNING**

When the C-arm is rotated by 180° and lowered to maximum, the image intensifier could touch the footswitch.

#### **Unintentional release of radiation!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.
- 

---

### **CAUTION**

If the C-arm is lowered all the way and the bracket is folded up, there may be contact between the multifunctional footswitch and image intensifier or tube assembly housing.

#### **Damage to the multifunctional footswitch and image intensifier or tube assembly housing!**

- ◆ Please make sure that the footswitch is not located underneath the I.I.
-

### Selecting the operating mode

The operating mode button of the multifunctional footswitch allows you to select one of the operating modes, i.e. DR, PFC, SUB, ROADMAP, or DCM (depending on the configuration level).



- ◆ If necessary, press this button on the multifunctional footswitch several times.
  - The operating mode selected is indicated in the **Examination** task card and on the control panel of the C-arm system.

### Releasing radiation

The left pedal is always used to activate fluoroscopy (CFC) (standard setting).

The right pedal is used to activate the currently selected operating mode. *Exception:* If fluoroscopy (CFC) is selected, the right pedal is assigned the digital radiography (DR) mode.



*The functionality of the pedals can optionally be changed.*

- ◆ Keep the foot pedal pressed during radiation release.

### Storing images (during radiation)



- ◆ Press this button on the multifunctional footswitch during radiation.
  - The image currently generated and displayed is saved in the local database.

### Storing images (after radiation)



- ◆ Press this button on the multifunctional footswitch.
  - The last acquired image is stored.



*The ARCADIS Avantic transfers images from monitor A to monitor B and then stores them in the local database.*

## *Sterile cover on the C-arm*

The C-arm including the image intensifier and the X-ray tube is completely covered with a three-piece sterile disposable cover of transparent polythene sheet.

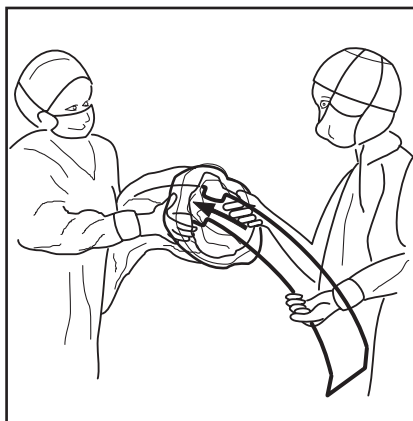
---

### **CAUTION**

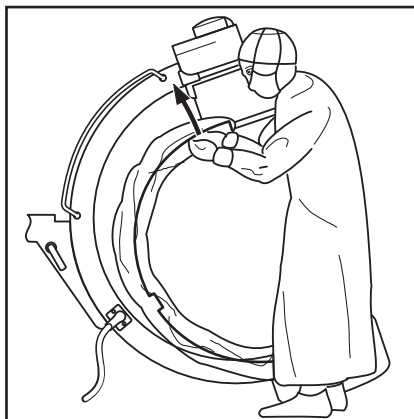
Insufficient attachment of the sterile cover.

**The patient can be injured if the cover falls down!**

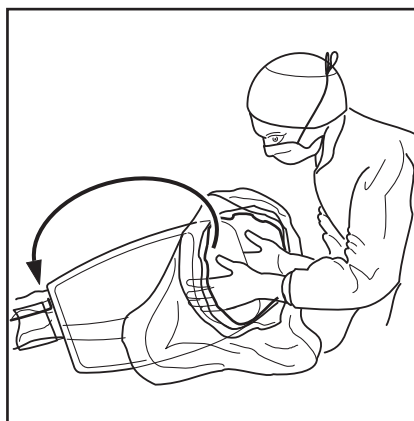
- ◆ When attaching the sterile cover with the metal bracket, make sure the cover is fastened properly.
- 



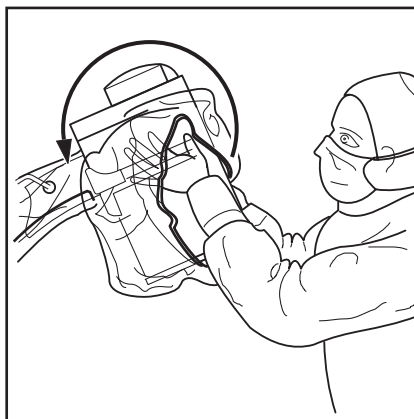
- ◆ Move the metal bracket into the transparent disposable cover.



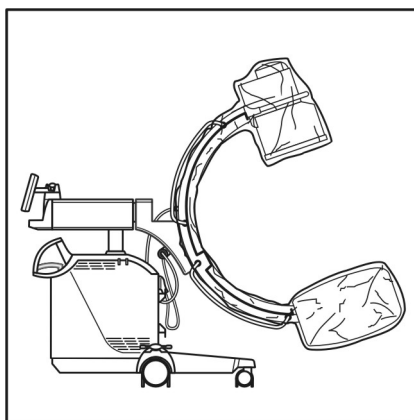
- ◆ Tension the metal bracket with the disposable cover into the C-arm.



- ◆ Pull the plastic cover over the X-ray tube assembly.
  - The plastic cover is fixed with an elastic cord.



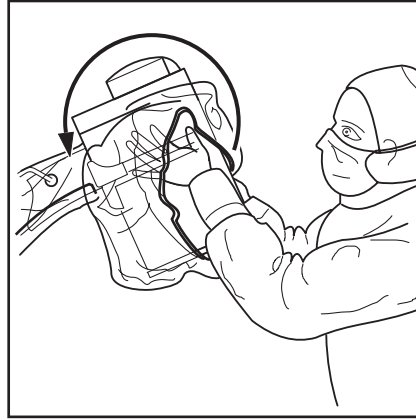
- ◆ Pull the other plastic cover over the image intensifier.
  - The plastic cover is fixed with an elastic cord.



- The C-arm is now covered completely.

### *Sterile cover on the image intensifier*

The image intensifier is covered separately with a transparent plastic cover.



- ◆ Pull the plastic cover over the image intensifier.
  - The plastic cover is fixed with an elastic cord.
- The image intensifier is now protected with a sterile cover



## *Integrated I.I. laser aimer (option)*

To project the target crosshairs, two Class 1M lasers are used whose exit windows are arranged offset by 90° in the holding ring for the I.I. grid.

- ❑ Laser specifications
  - Laser class: 1M (IEC 60825-1:1993+A1:1997+A2:2001)
  - Wave length: 635 nm
  - Color: red
  - Max. power: 0.8 mW ( $\pm 10\%$ )

---

### **WARNING**

Laser radiation

#### **Danger of eye injury!**

- ◆ Do not view the beam using optical instruments (laser class 1M).
- 
- ◆ Use the I.I. laser aimer as an aid for positioning the C-arm to reduce radiation exposure of the patient and personnel.

### *Single-tank laser targeting device (option)*

To project the target crosshairs, two Class 2 lasers are used whose exit windows are arranged offset by 90°.

- ❑ Laser specifications
  - Laser class: 2 (IEC 60825-1:1993+A1:1997+A2:2001)
  - Wave length: 635 nm
  - Color: red
  - Max. power: 0.6 mW ( $\pm 10\%$ )

---

#### **WARNING**

Laser radiation

##### **Danger of eye injury!**

- ◆ Do not look directly into the laser beam (Class 2 laser).
- 
- ◆ Use the single-tank laser targeting device as an aid for positioning the C-arm to reduce radiation exposure of the patient and personnel.